

Everyman's Encyclopædia

IN TWELVE VOLUMES

VOLUME ELEVEN

**Ragnarök
TO
Spiritualism**

THE THIRD EDITION

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RAGNARÖK—SPIRITUALISM**

EDITED BY ATHELSTAN RIDGWAY, LL.B.

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ABBREVIATIONS

The titles of subjects, which are printed first in bold type, have been abbreviated within each article to the initial letter or letters.

ac., acre(s).
 agric., agricultural.
 ambas., ambassador(s).
 Amer., American.
 anot., ancient.
 ann., annual.
 arron., arrondissement
 A.-S., Anglo-Saxon.
 A.V., Authorised Version.
 b., born.
 Biog. Dic., Biographical
 Dictionary.
 bor., borough.
 bp., birthplace.
 Brit., British.
 C., Centigrade.
 c., about.
 cap., capital.
 cf., compare.
 co., court.
 com., communica-
 cub. ft., cubic feet.
 d., died.
 Dan., Danish.
 dept., department
 dist., district.
 div., division.
 E., east; eastern.
 eccles., ecclesiastical
 ed., edition; edited.
 e.g., for example.
 Ency. Brit., Encyclopædia
 Britannica.
 Eng., English.
 estab., established; establish-
 ment.
 F., Fahrenheit.
 fl., flourished.
 fort. tn., fortified town
 Fr., French.
 ft., feet.
 Ger., German.
 Gr., Greek.
 gov., government.
 Heb., Hebrew.
 hist., history.
 horticult., horticultural
 h.p., horse-power.
 hr., hour.
 i.e., that is.
 in., inch(es).
 inhab., inhabitant(s).

is., island(s).
 It., Italian.
 Jap., Japanese.
 jour., journal.
 Lat., Latin.
 lat., latitude.
 lb., pound(s).
 l. b., left bank.
 long., longitude.
 m., mile(s).
 manuf., manufacture.
 min., minute(s).
 mrkt. tn., market town.
 MS., manuscript.
 mt., mount; mountain
 N., north; northern.
 N.T., New Testament.
 O.E., Old English.
 O.F., Old French.
 O.T., Old Testament.
 oz., ounce(s).
 par., parish.
 parl., parliamentary
 pop., population.
 prin., principal.
 prof., professor.
 prov., province; provincial.
 pub., published; publication.
 q.v., which see.
 R., riv., river.
 r. b., right bank.
 Rom., Roman.
 R.V., Revised Version.
 S., south; southern
 sec., second(s).
 sev., several.
 Sp., Spanish.
 sp. gr., specific gravity
 sq. m., square mile(s).
 temp., temperature.
 ter., territory.
 tn., town.
 trans., translated; translation.
 trib., tributary.
 univ., university.
 urb., urban.
 vil., village.
 vol., volume.
 W., west; western.
 Wm., William.
 yd., yard.

The article ABBREVIATIONS contains a list of those in general use
 See also ABBREVIATION (music) and ELEMENTS (chemical symbols).

Ragnarök, in Norse mythology the doomsday after which Alfadur (the All-Father) is to create a new heaven and earth where toll, pain, misery, and sin are unknown.

Ragstone, see KENTISH RAG.

Ragtime, form of popular music-hall song, in which both the air and words are 'ragged' or syncopated, i.e. broken in rhythm and with accent displaced, the accompaniment being in normal rhythm. There is, of course, nothing new in syncopation; Beethoven and later composers have exploited its artistic possibilities; but in R. it is carried to extremes, and the words generally rank below the level of ordinary nonsense-rhyme doggerel. R. probably originated from Negro folk-music, and preceded the later refinements of jazz and swing.

Ragusa, Duke of, see MARMONT, AUGUSTE FRÉDÉRIC LOUIS VIESSE DE.

Ragusa: 1. Tn. in Yugoslavia, see DUBROVNIK. "fr in the prov. and 32 m. W.S.W. of the tn. of Syracuse, Sicily; it is the ant. site of Hybla Heraca. It has manufs. of silk, cotton, woollens, and furniture, and a trade in wine, oil, cattle, and cheese. Pop. (including R. Inferiore), 50,000.

Ragwort (*Senecio*), name for a number of composite plants belonging to the genus *Senecio*. The common R. (*S. jacobea*) is an abundant weed in waste places, bearing a corymb of bright yellow flower heads and pinnatifid leaves. Among other Brit. species is the marsh R. (*S. aquaticus*), common in wet places.

Rahel, Antonie Friederike Levin (b. 1771), wife of Varnhagen von Ense (q.v.).

Rahers, see under BARTHOLOMEV'S (ST.) HOSPITAL.

Rahway, tn. of Union co., New Jersey, U.S.A., 20 m. S.W. of New York. It manufs. chemicals, printing presses, oils and carriages. Pop. 17,500.

Raiatea, one of the Society Is., in the Pacific Ocean, belonging to France, 150 m. N.W. of Tahiti.

Rai Bareil, or **Rae Bareil**, tn. in the dist. of R. B., United Provs., India, 49 m. S.E. of Lucknow. It has a well-built fort. Pop. 20,000.

Raiabolini, Francesco, see FRANCIA.

Raichur, dist. and tn. of Hyderabad, India. The dist. lies in the S.W. The tn. is 79 m. N.E. of Bellary. It manufs. a kind of glazed pottery. Pop. of state, 994,000; of tn. 32,000.

Raidrug, fort and tn. of Madras, India, in the Bellary dist., 34 m. S.W. of Bellary. Pop. 9000.

Raikes, Robert (1735-1811), Eng. philanthropist, b. at Gloucester, and in 1757 succeeded his father as printer and proprietor of the *Gloucester Journal*. He continued this work till 1802. He had early been active in the agitation for

prison reform, and in 1780 started a Sunday school at Gloucester, which developed into a national movement. A statue of him stands on the Thames Embankment. See A. Gregory, *Robert Raikes: Journalist and Philanthropist*, 1877, and a study by G. Kerdall, 1939.

Raikes, Thomas (1777-1848), Englishman about tn., was a London merchant and a governor of the Bank of England, who spent much of his leisure at the clubs and in society. He was an associate of Brummell. R. resolutely cultivated dandyism, but without much success. A portion of his jour. between the years 1831 and 1847 was pub. in 1856-57, and his *Private Correspondence with the Duke of Wellington* (ed. by H. Raikes) in 1861.

Rail, name for the members of the Rallidae, a family of birds with a long bill curved at the tip. The Brit. representatives include the land-R. or corn crane, coot, moor-hen or water-hen, and the water-R. (*Rallus aquaticus*). The last mentioned is typical of the family.

Railton, Herbert (1857-1910), Eng. etcher, b. at Pleasington, Lancashire, and educated at Mechlin and at Ampleforth College, Yorkshire. He contributed architectural and other drawings to the illustrated press, and was well known as a black-and-white artist. He illustrated a work on Westminster Abbey, a jubilee ed. of *Pickwick*; C. W. Stubbs's *Cambridge and its Story*, 1903, and C. Headlam's *Oxford and its Story*, 1904 (both in the *Medieval Towns* series); and, in collaboration with H. Thomson, W. O. Tristram's, *Coaching Days and Coaching Ways* (1888).

Railwaymen, National Union of (N.U.R.), forms, together with the Associated Society of Locomotive Engineers and Firemen and the Railway Clerks' Association, the prin. railway trade unions in the United Kingdom. The N.U.R. became organised as one of the strongest unions in the country during the first decade of the present century, being greatly influenced by syndicalist views (see SYNDICALISM) as interpreted by Tom Mann, who subordinated the peculiarly Br. ideal of a collectivist state, then much discussed, to the more practical policy of founding political influence on industrial power. Rates of wages, hours, and conditions of work are regulated by national agreements between the Railway Executive and the N.U.R. Disputes with the N.U.R. are subject to negotiation by the Central Wages Board and the National Wages Board, which latter body includes representatives of the N.U.R. as well as of the Railway Executive and the public.

Railways. HISTORICAL.—The first railway or 'tram road' is said to have been laid down at a Newcastle colliery during the reign of Charles I. and consisted simply of wooden planks laid on the ground.

The construction was improved from time to time by laying a second line of planks or an iron plate, renewable when worn, on top of the 'sleepers' and by using iron wheels on the wagons, and in this form R. became widely used in the eighteenth century for the carriage of coal from collieries to the nearest waterways. Flanged wheels on cast-iron edge rails were first tried in 1789. With the growth of mining and metallurgical industries after 1790 the use of railway transport became more common, and in 1811 S. Wales had a network of lines, some extending up to 21 m. totalling 150 m., while Tyneside and the Ironbridge area were also well provided. In 1801 the Surrey iron railway was built from Wandsworth to Croydon, partly as a public way, partly for the carriage of general goods; with its double track and double horseway it had a width of 24 ft. In 1810-16 came the Gloucester-Cheltenham line and about the same time the line from the Brecon and Abergavenny canal to Hay, which ran through the first railway tunnel. All these early R. were short local lines, often privately owned, intended for the carriage of heavy goods, mainly coal, relieving the roads of heavy traffic, and as an adjunct to the canal system. Speed was not a consideration and wagons, of no special design, were horse-drawn. The sight of a horse pulling a wagon on smooth rails was so like the familiar one of a horse pulling a boat on a canal that the term navigation was used to cover both forms of transport. Later skilled workers on railway line construction became known as navigators, 'navvies' for short. Wrought-iron bars were tried as rails in 1805 but cast-iron remained in favour, especially in the dumb-bell shape, until John Birkinshaw of Bedlington patented a method for rolling wrought iron in that shape (1820). Being adopted by the Liverpool and Manchester Railway these rails became generally used, and the modern design is based on them, though steel was used from the seventies.

Meanwhile Trevithick was experimenting with locomotives on the Cardiff-Merthyr line (1804). Blenkinsop constructed a rack-and-pinion engine which ran on a line near Leeds (1811), Blackett was busy at Wylam (1813) and George Stephenson at Killingworth (1815), and stationary engines pulling wagons by cable were tried, but in spite of Thomas Gray's vigorous plea in his *Observations on a General Iron Railway or Land Steam Conveyance* (1821), the 'present pitiful methods' of horse traction were still seriously considered when the Newcastle-Carlisle line was nearing completion (1834). However, in 1825 the Stockton and Darlington line was opened, worked by Stephenson's locomotive, and in 1827 the directors reported favourably. When the Liverpool and Manchester line was nearly complete discussion on locomotive versus stationary engines led to the famous Rainhill competition (Oct. 1829), won by Stephenson's 'Rocket' (q.v.). In 1834 a previous Act prohibiting the use of locomotives on the Newcastle-Carlisle

line was rescinded and the victory of the locomotive was complete.

In 1830 the Whitstable-Canterbury ('oyster') line was opened and worked by Stephenson's 'Invicta', and in 1833 came the Leicester-Swannington, the germ of the Midland system. There followed a feverish projecting of lines and promotion of companies; 54 railway Acts were passed in 1825-35 covering 500 m., and 39 Acts in 1836-37 added 1000 m., and while the former included the London-Birmingham-Preston (112 m., opened 1838) and the Grand Junction, and the latter the Manchester-Leeds with its 11-m. tunnel, the G.W., and lines from London to Southampton, Portsmouth, Dover, Brighton, Colchester, Cambridge, and York, many projects were still-born and the activity subsided in 1841.

In 1844 a new period begins with the emergence of the railway 'kings,' George Hudson, Carr Glyn, and Mark Huish, who started the amalgamation of lines into dist. systems such as the Midland, the L.N.W.R., the Lancashire and Yorkshire, the S.W., etc. The York, Newcastle, and Berwick line was built with the Newcastle high-level and the Royal Border bridges, and, through amalgamation with the Yorkshire and North Midland and the acquisition of the Newcastle-Carlisle and the Stockton and Darlington (1863), became the first complete dist. monopoly, the North-Eastern Railway, controlling all the lines between the border and the Humber, the Pennines, and the North Sea. Linking up with the King's Cross to York line (opened 1850) the E. coast route to Scotland was complete. By 1870 the mileage had increased to 13,600, by 1885 to 16,700; amalgamation and leasing of lines between the various companies was estab., and all the main lines of the modern system were operating; later additions were mostly branch lines, except the Manchester, Sheffield, and Lincolnshire Railway, later named the Great Central; the last London terminus (Marylebone) was completed in 1899. Under the Railways Act, 1921, the R. of Britain were grouped into four systems: L.M.S. (6940 m.); L.N.E.R. (6380 m.); G.W.R. (3793 m.); S.R. (2185 m.); total 19,298 m. of route. In 1916 the number of passenger journeys was 1,266,000,000 (including 257,000,000 by holders of workmen's tickets); in 1949 the figures were 992,782,000 and 223,626,000 respectively.

On the outbreak of the Second World War emergency legislation placed the R. under control of the minister of war transport, their finances being regulated under the Railway Control Agreement. This arrangement continued until, under the Transport Act, 1947, responsibility for the administration, maintenance, and operation of British Railways, together with certain ancillary services, passed on Jan. 1, 1948, to the Railway Executive, which acts as agents of the Brit. Transport Commission, in accordance with a scheme of delegation made by the commission, and approved by the minister of transport. The Railway Executive has the status of a public authority and deals with the public,

is the employer of the staff, and the body which enters into contracts and sues, or is sued, in the courts of law. The members of the Railway Executive are appointed by the minister of transport after consultation with the commission.' (Brit. Transport Commission, *Report and Accounts for 1948*, H.M.S.O. 1949.) The detailed supervision, operation, and maintenance of this, the most important unified railway system in the world, is vested in departmental officers in six regions; these are the London Midland, covering (with some exceptions) the former L.M.S. in England and Wales; the W., covering the former G.W.R., with additional lines in Wales and Cornwall; the S., covering the former S.R. E. of Exeter; the E., covering the S. area of the former L.N.E.R., Doncaster and Sheffield to London; N.E., covering the N.E. area of the former L.N.E.R., Doncaster, Huddersfield, and Bradford to Berwick; and Scottish, covering the former L.M.S. and L.N.E.R. lines in Scotland. To implement the plan of the Labour Gov. for the nationalisation of transport, five other executives were organised, namely, Road Haulage, Road Passenger, London Transport, Docks and Inland Waterways, and Hotels.

At the end of 1949 the staff of British Railways numbered 521,528, as against 649,792 at the end of 1918. There were 19,875 locomotives (steam 19,752, electric 16, Diesel and Diesel-electric 100, petrol 2, narrow-gauge 5); 41,073 passenger carriages, including rail motor vehicles; 1,113,143 freight vehicles; and 52,293 road vehicles. The estimated total passenger train mileage was 240,716,000 (228,128,000 in 1948); freight train mileage was 139,458,000 (137,444,000 in 1948).

Up to the 1880s Brit. R. served as a model for the world, both as regards construction and organisation. Brit. engineers built railroads both in Europe and overseas and both engines and rails were important items of export, though most European countries favoured the Vignoles flat-bottom rail spiked direct on the sleepers, the bull-head or dumb-bell type fixed in stools continuing in use in Great Britain; recently some stretches of track have been laid with flat-bottom rails, and this type has now been adopted as standard, as this design is more economic. Later improvements, mainly in rolling stock, have come also from the U.S.A. and European countries, where development was not hampered by earlier track construction which limited speed and weight.

In Canada the early railway building (1850-60) was not successful owing to lack of capital and the difficulty of envisaging the future trend of development of the country, and some of the work was inferior in quality. The Confederation Act (1867) provided a new stimulus and in 1871 the project of a transcontinental line was first formed, but some lean years followed and the financial arrangements were not completed until 1881. The Canadian Pacific line was opened in 1885, the Grand Trunk in 1903, and by 1908 there were 23,000 m. of line in operation. In 1949 the mileage was 42,838.

In Australia and New Zealand railway building began about 1870, mostly with gov. aid and under gov. control. Lines naturally ran from coast to inland. By 1871 Australia had 1030 m. of R.; by 1907 this had increased to nearly 16,000 m.; in 1949 the total was 28,471. New Zealand then had 3528 m.

The origin of European land settlement in Kenya is closely connected with the construction of the Kenya-Uganda railway. This system consists of the main line from Mombasa to Kampala, 879 m., with a connection to Kisumu, 131 m., and a number of minor branch lines (421 m.). The Benguela Railway in Angola was completed to Dilolo in 1929; it has since been extended through Rhodesia to Beira in Mozambique, thus completing the transcontinental route.

The lines of India form an extensive system of some 42,800 m. (including Burma) of various gauges. The three which are most important are the broad (5 ft. 6 in.), the metre, and the narrow (2 ft. 6 in.). The largest R. are the Great Indian Peninsular, the East Indian, and the Madras and Southern Mahratta. The various types of Indian locomotives are standardised, being built to the specifications of the Standards Committee. There are various small lines in India which run up into the hills, with many ingenious devices for overcoming the grades, such as reversing stations and circular tunnels. The most famous is the Darjeeling line.

The tremendous importance of railway development in the U.S.A. cannot be properly appreciated without close study of the geography and of the early history of the settlements. At the end of the 1812-15 war activities in the E. states were mainly commercial and industrial; in the S. were the cotton states, while the middle W., separated from the E. by the mts., was just beginning to develop as grain-, timber-, and coal-producer. The W. sold to the S. the bulky goods being floated down the rvs. (Ohio, Mississippi) on flat-bottom boats which were usually sold with the cargo as transport up-stream was not feasible. The W. bought from the E. but did not sell to them, as the heavy produce could not be carried over the mt. paths. R. were the only means of linking E. to W., and on the closer commercial connections followed a feeling of solidarity rooted in common interests, of grave portent in the civil war, where the W. sided with N. states. The first line projected was to run from Baltimore linking the coast with the Ohio valley (1831), though Ohio was not actually reached until 1853. In 1842 came the Boston-Albany line and the line from New York to Buffalo. The first locomotives were imported from the Stephenson works in England, and the iron rails were, in the main, imported from England until civil war days. It was the manuf. of rails, about this time, that gave the stimulus to the development of Klomann's forge in Pittsburgh, which was to become the Carnegie Steel Works. Railway systems were gradually expanded in

the organised states of the union, with more in the N. than in the S. The civil war gave a tremendous impetus to the railroads of the N., and they played their part in winning the war by quick transportation of troops, munitions, and food. By the same token the R. of the S. deteriorated, because, with its meagre supply of iron and steel industries, the Confederacy was not able to keep them up to standard.

The period following the civil war saw a great expansion in the railway systems of the U.S.A. On July 1, 1862, even before the war was over, President Lincoln gave his approval to a Bill of Congress incorporating the Union Pacific Railroad, the first transcontinental railway in the U.S.A. This company was to receive immense land grants and \$45,000 for each mile of railway completed. The route was to be from the little tn. of Omaha through Nebraska, Wyoming, and the Rockies to the Great Salt Basin in Utah. The Central Pacific had before that received a somewhat similar right to build eastwards from Sacramento, California, through the Sierra Mts. and the ter. of Nevada and on to Utah. Actual work started on both these roads simultaneously in 1864, while the war was still in progress. The labour engaged on the R. section was mostly Irish and that on the W. Chinese, a fact which strikingly typified 'the meeting of two worlds on American soil.' The two sections were dramatically joined in May 1869, near Ogden, Utah, where, with a characteristic gesture, a golden spike was driven in to celebrate the great occasion when for the first time the Atlantic and Pacific were 'bound together by iron bands of communication.'

In the meantime three other great transcontinental lines received similar charters. The Northern Pacific was to run from the waters of Lake Superior across Minnesota, through the Dakotas, the Yellowstone valley, the Rocky Mts. to Portland, Oregon. The Southern Pacific was to run from New Orleans across Texas, and thence to Los Angeles and San Francisco. The Santa Fé was to run from Atchison, Kansas, through Colorado, the Rockies, and thence to Santa Fé, New Mexico, and San Diego, California. By 1884 all had reached the Pacific Ocean.

In 1865 there were 35,000 m. of R. in the U.S.A. By 1873 this had been doubled, and by 1887 had increased to 87,000 m. Tns. like Kansas City, Cheyenne, St. Paul, Portland, and Seattle were originally creations of the R. Not only had the R. enormously increased their mileage, but they had been made more effective than those in Europe by reason of many Amer. inventions and discoveries which were adapted to Amer. usage. The first locomotives had been wood-burners. They were rapidly replaced by coal-burning expansion machines capable of enormous steam pressure. They steadily increased until they reached a size unknown anywhere else in the world. This was rendered necessary by the heavy

weight of the trains, the long distances they travelled, and the mountainous country through which many of them ran. In 1869 the Westinghouse air brake was invented; in 1871 came the automatic coupler; in 1874 the block-signal system; in 1875 the refrigerator car, which made possible the shipment of meat, fish, fruit, and vegetables all over the country. The Pullman sleeping-car had been invented in 1864. In 1900 the all-steel passenger and freight cars began to be used. While very expensive, this was done to lessen the dangers of fire and death in case of accidents.

The 1949 statistics showed that the U.S.A. had a greater railway mileage than any other country in the world, with a total of 227,244 m. Other figures were: Argentina, 26,710; Australia, 28,471; Canada, 42,336; France, 40,348 (1937); Germany, 36,256 (1937); Great Britain, 19,863; India, 42,600; U.S.S.R., 57,847. For its area Great Britain has the most. In the U.S.A. there were in service in 1916 45,511 locomotives, 1,768,400 freight cars, and 38,697 passenger cars; passenger revenue amounted to \$1,261,416,000 and freight revenue to \$5,866,351,000; employees numbered 1,387,000. The mileage of the longest Amer. R. is as follows. Southern Pacific System, 8171; Southern Railway System, 7706; Chicago, Milwaukee, St. Paul, and Pacific, 10,671; Pennsylvania, 10,113; Atchison, Topeka, and Santa Fé, 9096; Chicago, Burlington, and Quincy, 8814; Chicago and North Western, 8076; Great Northern, 8336; Chicago, Rock Is., and Pacific, 7031; Missouri Pacific, 7007; New York Central, 10,745; Northern Pacific, 6889; Baltimore and Ohio, 6192; St. Louis-San Francisco, 4925; Louisville and Nashville, 1755; Atlantic Coast Line, 5570; Illinois Central, 6552; Seaboard Railroad, 4132; Minneapolis, St. Paul, and Sault Ste-Marie, 4198; and Union Pacific, 9777.

Other Foreign Systems.—The R. of Europe form a very complete and extensive system, being nearly all of the same gauge, the exceptions being those of Russia and the whole of the Iberian Peninsula. Switzerland is pre-eminent in the matter of engineering triumphs, the great tunnels under the Alps being masterpieces of construction. Electric traction plays a large part in the lines of Europe generally, many lines having been constructed in almost every country. The Compagnie Internationale des Wagons-Lits provides a service of through trains between various points on the Continent. These trains consist solely of dining- and sleeping-cars, and run as the Orient Express from Paris to Istanbul, and from Calais to Trieste and Venice, and from Calais to Rome. In S. America several great amalgamations were made before the First World War, whereby the system of Argentina and the S. portions of Brazil were brought into close communication. The Andes have been tunneled and the lines extend to the N. of Peru, while the Mexican system links up with that of Guatemala. Elsewhere some of the most important R. are the

trans-Siberian (*q.v.*), a notable feature of which is the section that circumvents part of Lake Balkal; the Turk-Sib (*q.v.*); the Bagdad Railway (*q.v.*); the so-called Cape-to-Cairo Railway; the Hedjaz Railway; and the Damascus-Mecca line. (See also under the names of the different countries.)

LOCOMOTIVES. Steam Locomotives.—The design of locomotives did not change greatly from that of the 'Rocket' up to the seventies. The early engines had a long life and the track laid down was not adequate to support a much increased weight, nor did the curves allow of a much greater speed. Even the locomotives of the eighties were nearer in design to the original ones than to their modern successors; the express speed was still about 40 m.p.h. As traffic increased with the trade boom after 1870 larger locomotives had to be built. This chiefly meant larger cylinders, for all locomotives had low-pitched boilers between the wheels to give a low centre of gravity (mistakenly supposed to be necessary for safety), which limited the size of the boiler. Compounding was adopted on sev. R., notably the L.N.W.R., where F. W. Webb built sev. hundreds of engines on his patent system (1883-1903), with two small high-pressure cylinders outside and one enormous low-pressure cylinder inside. It was not until the end of the century that J. F. McIntosh of the (Aedonian Railway introduced his 'Dunalastairs' (1897), with large boilers placed over the driving-wheels; his example was soon followed on other lines, particularly by H. A. Ivatt of the G.N.R., whose 'Atlantics' (1902) had very large boilers and small cylinders. Compounds by now were out of favour, largely owing to the defects of Webb's engines, but the Midland Railway, under R. M. Deeley, built some large-boilered compounds on the Smith system (1901-5), with one large high-pressure cylinder inside, and two slightly larger low-pressure cylinders outside, which proved very successful. In 1906 the superheater was introduced to Great Britain by G. Hughes on the Lancashire and Yorkshire Railway, and from 1908 onwards it was widely adopted. The superheater, invented by Schmidt in Germany, dries and superheats the wet steam from the boiler, making it more like a gas, and enables larger cylinders to be used with the same size of boiler. During this period also the long-travel piston valve was introduced on the G.W.R. by G. J. Churchward. Modern Brit. locomotives usually have two simple cylinders for goods and slow passenger work, and three or four balanced cylinders for express work, to reduce hammering of the track at high speeds. Large boilers are fitted with superheaters; and outside Walschaerts valve gear, in combination with long-travel piston valves and large cylinders, results in a very free-running engine. Poppet valves worked by cams have been tried, and are proving very successful. Modern Amer. locomotives are of very large size, engines of normal type weighing up to 300 tons with tender,

as compared with the Brit. maximum of 150 tons. Two outside cylinders are almost invariably used, with Walschaerts or Baker valve gear, and long-travel valves; the boiler, fitted with superheater, is generally much oversized. Owing to the large grate to be fired a mechanical stoker is usually fitted. Cast-steel bar frames 7 in. thick or so are used, instead of the Brit. plate frame 1 in. thick; sometimes the cylinders and cross-stays are cast in one piece with the main frames, forming an 'engine-bed.' Modern continental locomotives may have plate frames combined with two outside cylinders, although three or four simple cylinders are used in countries where the track is light. Compounds are favoured in some countries, notably in France, where the four-cylinder engines of the Nord and Paris-Lyon-Méditerranée Railway are unexcelled for speed and power. In Germany compounds and plate frames have been superseded by simple engines with bar frames; this practice is being followed in other countries. Large boilers with superheaters are generally fitted. European locomotives of normal type weigh up to 210 tons with tender (Belgium). Colonial locomotives, as might be expected, vary very greatly; some R. (e.g. S. Australia) use locomotives of Amer. design, but of reduced size; others (e.g. Argentina) use locomotives of Brit. design, but of increased size; yet others (e.g. S. Africa) have their own standards. Locomotives are classified by their wheel arrangement, on the Whyte system; e.g., a locomotive with a four-wheeled bogie in front, six coupled wheels driven by the cylinders, and a two-wheeled trailing truck under the cab, is called a 4-6-2. Similarly a locomotive with eight coupled wheels and no carrying wheels is called a 0-8-0. Locomotives may have a tender (or separate vehicle) attached to carry their supplies of coal and water, or they may be built as tank engines, carrying fuel and water in tanks on the main frames. The latter are designated by the letter T on the Whyte classification, e.g. 2-6-4T. Tank engines are very rare in Amer. practice, but extensively used elsewhere. Common express locomotive types are 4-4-0, 4-6-0, 4-6-2 (England), 4-6-2, 4-6-4, 4-8-2, 4-8-4 (America), 4-6-0, 4-6-2, 4-8-2 (continental). Common freight locomotive types are 0-6-0, 2-6-0, 0-8-0, 2-8-0 (England), 2-8-2, 2-8-4, 2-10-0, 2-10-2 (America), 0-8-0, 2-8-0, 0-10-0, 2-10-0 (continental). Suburban and passenger traffic is worked by 0-6-2T, 2-6-2T, 4-4-0, 2-6-0 (England), 4-6-0, 4-6-2 (America), 4-6-0, 4-6-4T, 2-8-2T (continental). Common shunting engine types are 0-6-0T (England), 0-6-0, 0-8-0 (America), 0-6-0T, 0-8-0T (continental). Recent experimental locomotives (1931), differing radically from the normal steam locomotive, include the Ljungström and Zoelly turbine locomotives, and the Schmidt-Henschel, Gresley, Muhlfield, and Loeffler high-pressure compound locomotives with water-tube boilers. The largest steam

locomotive in the world (1944) is 'Big Boy', built by the Amer. Locomotive Company. It is a huge articulated engine, with 4-8-8-4 wheel arrangement and coupled wheels 5 ft. 8 in. diameter, designed for a maximum speed of 80 m.p.h.; total wheelbase (engine only) is 72 ft. 5½ in., and the overall length is 85 ft. 3 in.; indicated h.p., 7000. The largest and most powerful express passenger locomotives of each of the Brit. companies in 1944 were G.W.R., 'King George V.' (type 4-6-0, total working weight 135 tons); L.N.E.R., 'Cock o' the North' (2-8-2, 165 tons); L.M.S., 'Duchess' (4-6-2, 164 tons); and S.R., 'Merchant Navy' (4-6-2, 142 tons). But the largest and most powerful locomotive in Britain is the L.N.E.R. Garratt freight locomotive (type 2-8-0 to 0-8-2), with a weight of 178 tons. (See STREAM ENGINES.)

Articulated Locomotives.—A limit to the size of the normal locomotive is reached when the number of driving coupled wheels exceeds eight or ten, as trouble is then experienced in traversing sharp curves. Various types of articulated locomotives have therefore been evolved, in which one boiler is placed over two sets of wheels and motion, on separate frames flexibly connected together; this of course involves flexible steam and exhaust pipes. The Fairlie, the Mallet, and the Garratt are the most important types of articulated locomotive. The Fairlie, which came into use in 1865, had a double-ended boiler with the firebox between the two engine units, and is now obsolete. The first Mallet was built in 1887, and very large engines of this type are used in U.S.A. for heavy gradient traffic, a recent example weighing 500 tons with tender. The boiler of a Mallet is rigidly fixed to the rear engine unit, and is supported on slides by the movable front engine unit, which is pivoted at its back end. Most Mallets are compounds, with two high-pressure cylinders on the (rigid) back unit, and two low-pressure cylinders on the (movable) front unit; but modern Amer. Mallets have four simple outside cylinders, two on each unit. Common Mallet types are 2-6, 6-2, and 2-8, 8-2. Mallets are rapidly being superseded, except in U.S.A., by Garratts, of which the first example was built in 1909. The boiler of a Garratt is supported on a sort of bridge between two widely spaced engine units; it can thus be of any size that the loading gauge will allow, not being restricted by the presence of wheels and frames. Water and fuel are carried in tanks on the engine units. The Garratt is the only articulated type that can run at express speeds, and Garratts have with ease reached 60 m.p.h. on narrow-gauge lines. Garratts are in use in all parts of the world (except U.S.A.), the South African Railway alone having over 200, of which the largest type weighs 215 tons. Common Garratt types are 2-6-2+2-6-2 and 4-8-2+2-8-4.

Diesel Locomotives.—The absence of a boiler, the high thermal efficiency and the ease of handling and refuelling make the internal combustion (I.C.) engine a serious competitor to the steam engine

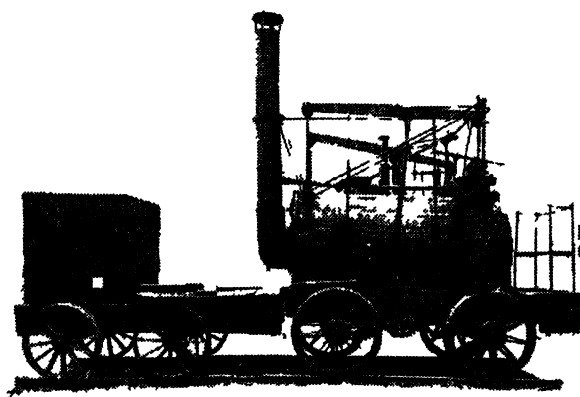
for locomotives. The most important disadvantage of the I.C. engine is its low torque at slow running; it can therefore not be directly coupled to the driving wheels. In some cases hydraulic transmission has been successfully used, and friction clutch and gear change has been tried, but so far electric transmission seems to offer the greatest advantage. The engine drives a generator supplying current to ordinary electric traction motors or, in other words, the locomotive becomes an electric locomotive carrying its own power station. The first high-speed train to use Diesel-engined locomotives was the Ger. State Railways' 'Flying Hamburger' (1933). Later a number of such trains were used, each with two Maybach 410 b.h.p. engines. Diesel-driven express trains have been put into service in Holland, Belgium, France, Argentina, Denmark, Italy, and in the U.S.A., where 6000 out of some 45,000 locomotives (1948) were Diesel-electric. Current production of Diesel-electric locomotives in the U.S.A. is at the rate of 1800 units per annum.

Railcars.—These combine the engine and the passenger and goods compartments on one chassis and are the means of meeting the modern demand for frequent service. In electric traction systems the design of a railcar presents no particular problems; transformers and motors can be built in any size. Steam-driven railcars are still in use but are gradually giving way to Diesel-electric cars, which need no boiler, have a higher thermal efficiency and thus require less fuel space, are easy to refuel and to handle and give off no smoke. The modern engine differs in design from those developed for road transport by the same manufacturers. There may be from three to twelve cylinders developing 120-500 b.h.p. at 1000-2000 r.p.m. The engine is usually of the four-stroke vertical type, though a number of two-stroke engines are in use. A horizontal engine for under-frame mounting was developed in Germany before 1939. The engine drives an electric generator supplying current to ordinary electric traction motors coupled to the driving wheels. Among the earliest Brit. builders were Wm. Beardmore & Company Ltd. The A.E.C. railcars built for the G.W.R. in 1934 were the first streamlined railcars in Great Britain. The Gardner L.W. engine is used in large numbers of railcars in Argentina, Belgium, India, and Australasia.

ELECTRIC RAILWAYS.—The question of railway electrification differs widely in its application to main-line and to suburban traffic, in its economical as well as in its technical aspect. Suburban service requires frequent trains throughout the day, with frequent stops, and increased seating capacity during rush-hours. Electric trains made up of train units, each consisting of one motor coach with one or more trailers, provide the necessary flexibility of operation and the direct current (D.C.) series motor with its excellent accelerating characteristics, light weight, and simple (continuous) speed

HYDLEY'S 'PUFFING
BILLY' LOCOMOTIVE
1813

*Crown copyright
Science Museum
South Kensington*



4-6-2 'PACIFIC'
CLASS LOCOMOTIVE
1948

(Standard livery
1949)

British Railways



CANADIAN NATIONAL RAILWAYS 9000 CLASS DIESEL LOCOMOTIVE, 1949

control is ideal for the purpose, as it enables a high schedule speed to be attained, and thus a higher train mileage can be achieved with less rolling stock than is possible with steam trains. Further congestion at terminal stations is avoided owing to the quick turn-round, and no time is lost in fuelling. Suburban lines radiate from or connect large cities where power stations are otherwise available, and suburban traction constitutes a useful load-balancer on the power station as the load is fairly evenly distributed through the day when the lighting load is least, and the power demand can usually be met without substantial increase in the generating capacity and, in particular, without additional reserve capacity or increase in staff. Distances are shorter and trains are lighter than in main-line services, and very high voltages, which alone make long-distance transmission of large power amounts possible, are not required. Main-line electrification has been largely confined to countries disposing of large water-power resources and where coal is not available at prices to compete with hydro-electric generation. Electric trains are technically superior to steam trains in tunnels, owing to the absence of smoke, and on lines with steep gradients, but otherwise a choice of system can only be made after careful consideration of capital and working costs; the former are considerably higher for electric lines, and both vary according to the locality. In countries where either steam traction or electric traction has become established, it is not likely that any radical change-over would prove economically feasible at present. The question of electric generation by means of steam raised by atomic pile heating cannot as yet be adequately discussed.

Two systems of electrification are at present in general use: D.C. at voltages from 600 to 3000 V, and single-phase alternating current (A.C.) at up to 15,000 V at low frequency, 16½ cycles (c/s) in Europe, 25 c/s in the U.S.A. The only notable large-scale exception is the It. State Railway, three-phase 3600-V system in N. Italy. For suburban lines the D.C. system is now universally employed, at voltages of 600-1200 V, most services being operated on the motor coach unit principle. Each motor coach has two or four motors, each of between 150 and 300 h.p. and the power per driving axle is 100-250 kW. The weight of a motor coach without passengers is between 20 and 70 tons. The adhesive weight of a train consisting of sev. units is thus distributed over a large number of axles, usually two or four per motor coach, and the total weight of the train is more uniformly distributed on the track than would be the case with a locomotive-hauled train. Current is supplied to the trains through an overhead contact wire for higher voltages, the track rails carrying the return current. For low-voltage lines the supply is usually through conductor rails supported on insulators; one rail may be placed in the middle between the track rails and the

other at the side, or both at the side, and if the track rails are used for carrying the return current only one conductor rail is required.

In the case of overhead contact lines the current is carried to the motors through a bow or a pantograph collector sliding on the under-side of the contact wire, contact being maintained by a spring attachment on the roof of the vehicle for the bow collector, while links in the pantograph are joined by springs. In the case of contact rails a collector shoe slides on the rails, its weight being usually sufficient to maintain contact. In some cases the contact rails are suspended from insulators and the collector shoe slides on the under-side, being pressed against the rail by a spring. This arrangement allows of protecting the upper rail surface against contact with other objects and keeps the contact surface free from dust, rain, sleet, or falling leaves. Side-contact with a specially shaped contact rail has also been used. The contact rail system has been used for up to 1200 V, but for voltage above 1000 the overhead system is preferable. To ensure constant height and adequate rigidity of the contact wire it is suspended (and insulated) from a steel cable by a number of closely spaced vertical hangers. The steel cable is supported (and insulated) from the masts and naturally hangs with a sag between the masts, in the shape of a catenary. Sometimes double catenary suspension is used.

As the power transmitted by the line is measured by the product of voltage (V) and current (I), whereas the losses due to dissipation (heat) in the wire are the product of wire resistance (R) and I^2 and the consequent drop in voltage is RI , high-voltage transmission is most economical, but a limit is set to the voltage in a D.C. system by the switchgear which becomes unmanageable above 3000 V, though experiments with 4000 V have been carried out. High current values would require heavy (low-resistance) contact lines and the current collectors would become unwieldy. There is thus a limit to the power that can be supplied on the D.C. system, i.e. to the traffic that can be handled. The volt drop in the line is kept within limits by feeding the line at intermediate points by cables direct from the substations. Energy is delivered from the large generating stations or tapped from the main A.C. high voltage network to substations suitably placed along the line, where it is converted by mercury-vapour rectifiers into D.C. The modern substations are automatic in operation and remote-controlled.

Main-line traffic involves both passengers and heavy freight, and trains are locomotive-hauled. The longer distances and the greater power required make high voltages imperative. The Fr. R. (Midi, Paris-Lyon-Méditerranée, Orléans) use 1500 V D.C. and this system is also employed in Holland, Belgium, Spain, N. Italy, Australia, New Zealand, and India, while some Amer. lines, notably the Chicago, Milwaukee, and St. Paul, the Paulista in Brazil, and the Transandine,

and the Chilean, use 3000 V D.C. Single-phase (A.C.) is used in Norway, Sweden, Germany, Switzerland, Austria, and Italy, and in the U.S.A. The limits to the D.C. system were discussed above. They hinge on the impossibility of stepping down the high voltage required on the contact line for efficient transmission, to the low voltage manageable on the locomotive. As modern electric locomotives are built for powers up to 3000 kW, or more this would require a contact wire of a carrying capacity, at 3000 V, of 1000 amps., which involves a formidable amount of copper. On the other hand, it is possible to use the ordinary three-phase 50 c/s supply as generated, for conversion into D.C. in the substations by the mercury-vapour converter. It has been suggested that the locomotive itself might act as substation, carrying transformer and rectifier, while the contact wire is fed at high voltage direct from the generating station. At present, however, the mercury-vapour converter is too sensitive to vibration, and the additional weight of the locomotive is a drawback. Conversion by rotating machinery is too inefficient to be considered; the power would have to be built in twice: in the motor and in the generator. A.C. is easily stepped down to a suitable low voltage by the ordinary, highly efficient transformer, but the only satisfactory A.C. traction motors so far developed are single-phase motors of the series type, compensated commutator motors, compensated repulsion or series-repulsion (Déri) motors, working at low frequency (16½ c/s). It is therefore necessary either to build separate generating stations for supplying the railway system, with sufficient capacity to cope with peak load, and with adequate reserves, or to convert the available 50 c/s supply in substations. Special low-frequency generators are sometimes installed in the main power stations. The mercury-vapour converter for frequency conversion presents some problems, and conversion is therefore usually done by rotary converters, though with some loss in efficiency. Experiments have been carried out in Germany with a 50 c/s commutator motor and the results seem promising, but long experience under working conditions is necessary before final judgment can be made. The only three-phase motor used in traction is the induction motor at 45 or 50 c/s, but three-phase supply needs three contact wires, two if the track rails are used, and the speed of the motor can only be varied by changing the number of poles, or by using two motors connected in cascade. The speed of the induction motor depends on the frequency of supply and the number of poles, but with increase of load the 'slip' (sagging behind the synchronous speed) increases slightly. Speed control of the series motor is effected by varying the voltage. In the A.C. system, where transformers are necessary for stepping down the high line voltage to that suitable for the motors (about 400 V maximum) the transformer windings are provided

with the requisite number of taps giving the required voltage values. The D.C. motor is built for full line voltage and supplied through regulating-resistances successively cut out as the motor gains speed. To save the losses in the resistances during the starting and accelerating periods the motors are first connected in series and when constant speed is attained they are connected in parallel. With four motors series, series-parallel, and parallel combinations in turn are possible. These operations and the insertion and cutting out of resistances are effected by moving the handle of the controller (*see under TRAMWAYS*). Multiple-unit motor-coach trains may be controlled from one master controller, which either operates the controllers in the other motor coaches pneumatically or electrically, or controls the switching of all the motors directly. When a train is running downhill the motor armature is driven by the wheels



English Electr. Co. Ltd.

ELECTRIC LOCOMOTIVE

A 3000 h.p., 3000-volt D.C. locomotive of the Central Railway of Brazil

and the motor acts as a generator. In case of the D.C. motor this 'regenerative braking,' that is, feeding back the energy thus developed into the line while the motion of the armature is thereby retarded is a simple matter; it is only necessary to provide some additional excitation of the field to ensure that the voltage generated exceeds the line voltage. The A.C. commutator presents some difficulties as the frequency of the A.C. is involved. Regeneration braking is also possible with induction motors. On motor coaches the motors are usually nose-suspended, one side of the frame being supported on the driving axle, the other on the frame of the coach, but on high-speed locomotives frame suspension is always used. In the latter case flexible transmission to the driving wheels is necessary, either through crank and connecting rods or mounting the gear wheel on a so-called jack shaft, or through 'quill' drive. In motor-coaches the motors are usually connected to the driving wheels through single 64:1 spur gear, but gearless motors with their armature keyed on the driving axle and the field magnets supported on the frame are also in use.

In 1942 the Brit. S.R. introduced a new type of electric locomotive for the

operation of freight and passenger services. It consists of a box-type cab carried on two six-wheel bogie trucks. The cab contains an electrically fired boiler for supplying steam for heating passenger trains. A novel feature embodied in the design enables the locomotive to continue a drawbar pull when passing over the gaps in the conductor rail when no collector shoes are in contact with the conductor rail. With a 1000-ton freight train the engine has an acceleration to 24 m.p.h. in 100 sec. and hauls the heaviest passenger train at a speed of 75 m.p.h. A gas turbine, driving electric motors, was used in a Swiss-built locomotive introduced into Britain.

The Liverpool overhead railway was opened in 1893, being electrified at the start, and was the first overhead railway in the world to be so operated. The under-riv. Mersey railway was converted from steam to electric traction in 1903, the Liverpool-Southport, 1904, and, in the Manchester suburban area, the Bury line was electrified in 1916. The Altrincham route, electrified in 1931, was the first railway in Britain to adopt the 1500-V overhead conductor system, as recommended by the Pringle Committee. Electrification has characteristic features which make it suitable for some kinds of traffic, e.g. the trains can be driven from either end, the number of coaches can be adjusted to traffic requirements, uniform speeds are possible, and so on, and these features make electrification particularly suitable to the operating of intensive suburban services, such as those mentioned above. The British Railways S. Region has now the largest electrified suburban system in the world, and the conversion has made possible a 70 per cent increase in services to and from London in the rush hours.

UNDERGROUND RAILWAYS AND TUNNELS.—Under this heading is comprised not only underground city R., but also that specially difficult part of the contractor's business, viz. tunnelling. Where possible the centre-line is set out on the surface under which the tunnel will run, and a series of shafts are sunk from 100 to 300 yds. apart. To transfer this line underground two marks are made in the cross-timbers, in the centre-line, at the bottom of each shaft and prolonged in both directions when the tunnel is being opened out. In tunnels of great length, e.g. the St. Gothard, the centre line is determined by a triangulation survey. Small section tunnels are usually driven from one end to the other at their full dimensions. With large section tunnels a pilot heading is excavated in advance and later enlarged to the full section. Under suitable surface conditions long tunnels are generally driven from a number of 'faces' by sinking shafts along the line of the tunnel and starting working faces in both directions from each shaft bottom. In heavily watered rocks or clay a Great-head shield is sometimes used, consisting of a ring of steel which is forced forward by hydraulic rams. In difficult cases work under pressure with an air lock may be required. (See further under TUNNEL-

LING.) Famous tunnels include the Simplon, between Switzerland and Italy, 12½ m. (the longest of the five big Alpine tunnels); the Apennine tunnel in Italy, 11½ m.; the New Cascade tunnel through the Rocky Mts., 7½ m., the longest in America; and the Severn tunnel, England, 4½ m. The 'tubes' of London's excellent system were all constructed with the Great-head shield, whilst the Metropolitan and the District were constructed where possible by 'cut and cover'. The prin. London 'tubes' are the Edgware, Highgate, and Morden (a combination and extension of the old Hampstead and Highgate, and City and S. London lines), the Piccadilly, the Bakerloo, the Central London, and the Post Office Tube. The latter, which is a narrow-gauge tube, is automatically operated and carries only mails.

The London underground railway has 280 stations, 4000 coaches, 10,000 m. of telephone wire, and the longest tunnel in the world (17½ m.), from E. Finchley to Morden. New York has an extensive underground (subway) and tube system, while the main-line R. on Manhattan also travel in tunnels, and are electrically operated. Underground systems are also to be found in Paris, Berlin, Moscow, Madrid, Buenos Aires, Tokyo, Glasgow, and other large cities. Underground city R. in nearly all cases are worked with 'multiple unit' trains, on the 600-800 V D.C. system. The track of the London underground railway is laid with an up-gradient at the entrance to, and a down-gradient at the exit from, the stations, to facilitate stopping and starting.

MOUNTAIN RAILWAYS.—It is to Switzerland that attention must be turned to see how the railway engineer has scaled the peaks and brought his lines up to the summit of great mts. like the Jungfrau. These lines would have been impossible but for the use of the rack; the one mostly used, invented by M. Abt, consists really of two racks placed side by side, the teeth on one corresponding to the spaces on the other. The first rack-and-pinion railway was constructed by Blenkinsop near Leeds (1811) and for some time the curious opinion prevailed that no other way of working was possible with a locomotive. The rack-and-pinion system really came into its own in 1869, in which year the Amer. engineer March built a mt.-climber, the Mt. Washington Railway in New Hampshire, U.S.A., on this system, and three years later, through the ingenuity of Riggenbach, Europe saw its first rack-and-pinion up the Ulgi, in Switzerland. The gradients which formed part of the problem of building this famous railway were of formidable magnitude. The rock is nearly 7000 ft. high and rises 5600 ft. above the valley. The slope varies, however, even the easiest being 1 in 5, and the average over the 3 m. of line is 1 in 3. There is probably no railway which has ever tackled gradients steeper than 1 in 2, but mechanical transport of some kind can be provided for any inclination. Lifts negotiate the steepest rise of 1 in 0. But the funicular railway, which may be classified between the lift and the rack-

and-pinion, is practically independent of the gradient. The Virgil line in the Tyrol, for instance, has a rise of 1 in 1.43.

In the early days the funicular was almost always employed, consisting of two cars, one ascending and the other descending, connected by a rope passing round a pulley at the top. In this system the descending car, plus a sufficient water ballast, draws up the ascending car. For long hauls electric motors are used to assist the winding of the rope. A good example of the latter type is up Salvatore outside Lugano, of a length of 1 m., the maximum grade being 63 per cent.

In the pre-electric days a system was largely employed in which the engine pushes the car up, and the car follows the engine down. In the case of the Righi Railway the boiler is placed as usual in a locomotive, but in the Pilatus Bahn it is placed across the frames, so that the water is equal in depth at both ends. Such a line exists in Wales from Llanberis to the summit of Snowdon, and has been running for many years. It is steam operated, $4\frac{1}{2}$ m. in length, with gauge, 2 ft. 7 $\frac{1}{2}$ in. The only other line to the top of a mt. in the Brit. Isles is the Fell line to the top of Snaefell in the Isle of Man.

The modern type of purely mt. line is worked by electric traction, either continuous or A.C. being employed. Such lines are numerous, and the most modern are constructed largely in tunnel, e.g. the line up the Jungfrau, the last portion of which is almost entirely concealed from view, the stations being opened out in the form of galleries. Certain lines, too, must be classed under this heading, in which for a portion of the distance racks are laid down to assist the locomotives on heavy grades; an example of this type runs over the Brenner Pass, and another occurs in New Zealand, where the grade in one place is exceedingly long and adverse. Special locomotives, of course, have to be built for these services, it being usual for the cylinders driving the wheels which engage the rack to be separate from the ordinary 'adhesion' mechanism. The Jungfrau Railway still ranks as possibly the most noteworthy feat of railway engineering in Europe, but there are mt. R. in other parts of the world which are at least equal achievements; for instance in S. America remarkable work has been accomplished in joining the great cities of the Pacific coast to the Atlantic ports. A fine example is the line connecting Valparaiso with Buenos Aires, over 1000 m. long, the first section passing over the Andes at a height of 14,000 to 16,000 ft. A famous cable railway for ordinary passenger traffic ascends the Wetterhorn in the Bernese Oberland. It was designed by Feldmann (the engineer who built the curious suspension railway at Wuppertal); he employed two carrier cables in each direction, corresponding to the rails of a railway track, but the cables lay above each other, not side by side. He thereby eliminated the swaying of the car, an objectionable feature in other systems, especially in a strong wind. Another cable railway leads

to the Kohler Peak in the Tyrol. The cables are 1 m. long and the journey takes 13 min.

LIGHT RAILWAYS.—In dists. where the traffic is insufficient to support a railway of main-line class, facilities are often provided by light R., especially abroad and in the colonies. In England, where there are metalled roads even in the most thinly populated dists., a service is more easily given by omnibus, and such light R. as there are were laid down before the coming of the motor car, and are now generally in a poor condition. Exceptions are to be found in light R. catering for a special class of traffic, such as the East Kent Railway, which feeds the Kent coalfield, and the 15-in. gauge Romney, Hythe, and Dymchurch Railway, which is worked by scale model locomotives, and carries mostly holiday-makers. Outside England light R. and steam tramways are much used, since a single line of railway costs much less to construct and to maintain than a metalled road of corresponding capacity. They are often laid in undeveloped country, such as Africa, or in dists. where travel is a novelty, such as parts of India, with a view to being replaced by main-line R. as soon as the traffic has grown sufficiently. They are generally laid to a narrow gauge (metre, 3 ft., 2 ft. 6 in., and 1 ft. 11 $\frac{1}{2}$ in. being usual sizes), though standard gauge light R. are not unknown. The latter have the advantage of being easily convertible to main-line standard should the traffic warrant it, and are not much more expensive than narrow-gauge lines in first cost; the latter, however, permit more flexibility in curves.

MONO-RAILWAYS.—During the first few years of the present century the high-speed line at Zossen brought forward inventors with all sorts of schemes for linking up important cities by very fast trains. Such schemes were propounded for running between Liverpool and Manchester, and London and Brighton. Electricity was to be the motive power, and in order to minimise friction some sort of single-rail design was to be devised. The Listowel and Ballybunion had been running since 1888 on the Lartigue mono-rail system quite successfully. In this system the coaches, locomotives, etc., run on a rail shaped like an A, the seats being back to back with the running wheels inside the backs of the seats; small wheels at the base of the carriages serve to balance the whole system. The locomotives have two of everything, one on either side of the central rail. This principle was to be employed on these fast inter-urban lines, but the projects fell through. The most successful form was that invented by Brennan, involving the use of two high-speed gyroscopes revolving in opposite directions and in a vertical plane parallel to the direction of motion. These large wheels were kept working on ball bearings in a vacuum, and therefore continued to run for a long period, even if any mishap occurred. Owing to the precessional action of these gyroscopes, the cars tended to tilt outwards when

rounding a curve, instead of inward as provided for by banking the outer rail on an ordinary line. In spite of the great weight of each car, since it has to carry its own gyroscopes, there seems an undoubted field for their use where a temporary line has to be laid very quickly, as the track seems to require next to no foundation, and the straightness of the running rail does not seem to affect the running of the cars.

PASSENGER SERVICES AND ROLLING STOCK.—In the early days passengers were conveyed at speeds varying with the class or fare charged; thus first and second class and those who travelled, as many did, in their own carriages placed on trucks were moved more rapidly than the third class or 'parliamentary' passenger. This state of affairs continued till 1872, when the then general manager of the Midland announced the startling news that third-class passengers would be conveyed on all trains. As at that date the Midland were employing Pullman cars at a supplementary fare on first class, in 1875 they abolished second-class carriages, and reduced first-class fares almost to second-class level. Originally fares were fixed on the basis of 3d., 2d., and 1d. per m. for the three classes, but as one line after another abandoned second-class carriages or retained them only for a restricted service, and also reduced their first-class fares, 1d. per m. for the third class and about 2d. per m. for first class became very general. In 1917, in consequence of the First World War, all fares were increased by 50 per cent, excepting workmen's, season, zone, and those on the London tubes. In 1920, owing to the inflation of money, there was a still further increase to 75 per cent over pre-war level. But this addition remained in force only till 1923, when 50 per cent over pre-war rates became the recognised standard.

From 1872 to the time of the outbreak of the First World War was a period of active railway expansion, and, although during the last few years of that time motor traffic was already drawing upon the business of the R. in many parts of the country, the companies were experimenting with electric power in suitable areas, particularly in the S. of London. Broadly the hist. of the period was one of railway enterprise and public response. Just as speeds increased, so also the style of accommodation improved, so much so that the last part of the nineteenth and the early part of the twentieth century witnessed a remarkable revolution in railway travelling. Dining-cars, long vestibuled expresses, corridor carriages, and means of getting refreshments *en route* provided attractive travelling, while traffic superintendents and general managers attracted their traffic by providing the right sort of train at the right time. Typewriting compartments were introduced on two trains each way between London and Birmingham. Even suburban lines, like the Metropolitan Extension, started their Pullman breakfast cars; Clacton had its midnight supper car—everything was done to attract the man

who need not travel, *i.e.* who goes only because it is sufficiently attractive. After the First World War this progressive policy was well maintained in long-distance passenger traffic. Carriages are steam-heated at the control of the passengers; improved ventilation has eliminated draughts and, on some modern trains, air-conditioning is provided, but of course not all rolling stock reaches the high standards of the best trains, and there is still much out-of-date stock in use, especially on local and cross-country services.

A notable improvement in recent years has been the introduction of buffet cars, the first modern car of this kind running between London and Cambridge in 1932. Recently experiments have been carried out both in England and France on



LOUNGE CAR ON THE PERE MARQUETTE RAILWAY, U.S.A.

pneumatic rubber tyred wheels for passenger coaches. This adds to the comfort of travelling by eliminating the 'hammer-blows' of the steel tyre at rail joints, but on high-speed trains the life of the rubber tyre would be short, and experience in working is still lacking. Three trains with pneumatic-tyred cars hauled by steam engines were put into service on Fr. R. after the Second World War, railcars with such tyres having been introduced in 1931.

Owing to their increasing luxuriousness, express trains have become very heavy. Corridor coaches weigh 35 tons, dining cars 40, sleeping-cars (holding ten to twelve passengers) also 40; hence the modern express total up to 500 or more tons exclusive of the locomotive, or with it 670. Platforms were the next difficulty, as at some stations, especially terminals, long trains could not be accommodated, and even if they could the locomotives were hampered by loading gauges. The length of the Cornish Riviera express is 1050 ft., or nearly a fifth of a m. Admitting the necessity for depilating long-distance traffic, the

superintendent finds that there is no room for local trains. This entails duplication of the line, and that too probably in the most expensive part. On a line with a fine long-distance traffic a sudden growth of suburban trains is a serious thing. Admitting that this is largely a two-period traffic, yet it may have to overflow to the express lines, and so the problem comes of what steps are to be taken to meet this expanding traffic. On the old G.E.R. section of the L.N.E.R., with probably the heaviest suburban traffic in the world, everything possible was done without altering its lines. The carriages were widened to seat six aside, the platforms were lengthened, two more coaches added to the trains, and more powerful locomotives were built. One obvious remedy, if it be called on to meet any further increase in traffic, is the electrification of its existing metals: this has been done between Liverpool Street and Shenfield.

Eng. R., looked at from a point of view of speed and precision, stand pre-eminent. On certain lines trains of enormous weight are taken at speeds that do not fall far short of the m-a-min. timing. The long non-stop runs that are such a feature of Eng. services have been made possible by Ramsbottom's pick-up water troughs, whereby the water can be renewed at speed, and (more important still) at places where the water is suitable for boilers. The longest daily non-stop run in the world is from King's Cross to Edinburgh, 392.7 m. in 460 min. Other long runs are from Euston to Carlisle, 301 m. in 400 min. The W. Region 'Cornish Riviera,' which long held the record by its run from Paddington to Plymouth, 225.7 m. in 240 min., lost the place of honour purely because it had no stretch long enough to compete economically with the run from London to Scotland.

Speed is a ruling factor and the R. have not been able to disregard it. The public in Britain naturally think that the 60 m.p.h. level ought to be accepted, as it is in France and Germany (before 1939) as the standard of speed on the main services from the metropolises. The demand for higher speed, however, gives rise to numerous special difficulties, such as track improvement, bridge strengthening, elimination of sharp curves, effect on local services, improvement of brakes, and greater visibility of signals. An express train of twelve to thirteen coaches travelling at 60 m.p.h. can be brought to a stand in approximately 360 yds. The vacuum brake is used on most steam trains and the Westinghouse compressed air brake on electric trains.

The R. also run purely postal trains which only convey passengers by permission, solely composed of travelling post office vans and the like, whereby bags are discharged or picked up at speed. Newspaper specials, too, are chartered by the prin. London dailies, which, by going to press an hour or two earlier, reach their destination ahead of the pub. of local papers. Railway stations, especially in industrial districts, are often grimy and depressing. The London Passenger Trans-

port Board has set a high standard and many of its stations are even attractive. Waterloo station has been greatly improved, and Paddington is also a model of convenience. The companies made considerable improvements in many prov. stations, notably at Chesterfield, Exeter, Leeds, Sheffield (Victoria), and Twickenham, some of which have been completely remodelled.

GOODS SERVICES.—It is from these that the R. derive the greater part of their income, and the prin. portion of the goods is carried under the classification of minerals. Indeed it was for this purpose that the Stockton and Darlington line was originally promoted, as at that time the whole of London's coal supply came by sea from the N.E. ports. When the Midland and S. Yorkshire coal pits had lines constructed in their vicinity, the only railway then running to London (the London and Birmingham) refused to carry coal as being detrimental to the better-paying passenger and merchandise traffic. It was not till the G.N.R. was opened in 1850 that London had its first regular railborne supply. Here be it said that in order to equalise matters in the case of collieries, the strict mileage charge is often abandoned, as it is found more profitable to charge the traffic what it will bear. Goods in general are divided into eight classes: A, B, C, and 1-5. The rates charged are lowest for Class A, which includes minerals in the raw state, and highest for Class 5, which includes the most expensive and fragile manufactured articles. Again the lettered classes are generally removed by the consignee, whilst the numbered goods have to be collected and delivered. It has often been remarked that the Eng. R. employ such small wagons for such a lot of traffic, but the reason is not far to seek. The R. cannot afford to wait till they have collected enough goods to form a 30-ton load, and so the smaller-sized trucks are employed. The same applies even in the case of coal, though there must also be added the reason that colliery sidings often do not allow large trucks in them, owing to the loading gauge, which is more restricted than usual. The R. have now ample numbers of the newer big trucks and certain specially built ones for carrying awkward consignments, like big guns, girders, or large castings and boilers. 'Containers,' or big enclosed steel or wooden receptacles, have proved of great value. These containers in many cases are just adapted to occupy a railway truck, and also to stand upon a trolley. They have appliances and fittings by which they can be transferred from one vehicle to another or into the hold of a ship. Much attention has been paid in recent years to the modernisation of goods depots and terminals, and the lay-out of the latter has been entirely remodelled to facilitate more rapid handling of goods. The greatest pre-war improvement was the speeding up of freight trains. Express freight trains run throughout the night between all important centres and the fastest are

composed entirely of vehicles fitted with continuous vacuum brakes, like passenger trains, and this enables them to average speeds of 45 m.p.h. In meeting the needs of modern traders the R. have developed ancillary road services. The railroad depot system, too, offers the advantages of rapid transit in bulk by rail with the flexibility of road transport distribution in small quantities. Though the general trend in retail trading has been in the direction of smaller consignments (largely owing to fluctuating prices) there has been a period in the opposite direction for some kinds of traffic, in connection with wholesale and industrial traffic, notably milk, oil, and petrol, which are carried in tank wagons, and grain, bricks, steel sheets, etc., which are also carried in specially constructed vehicles. Bulk forwarding of liquids enables economies to be effected in handling and in the capital outlay required as compared with carriage in barrels or other small containers. During recent years experiments have been made in providing shock-absorbing wagons for conveying glass, concrete pipes, and other articles particularly liable to damage.

SIGNALLING.—The route mileage of the R. of Great Britain is 19,630, and the number of train m. is about 380,000,000, worked by about 20,000 locomotives, giving an average of a train every half-hour each way over each m.; taking into account the large amount of single track (about 7200 m.) this is a very high traffic density. Before the days of block signalling and telegraphs the time interval was the only means of keeping a proper distance between following trains, so that, if the front train broke down, and notice could not be sent back to the nearest semaphore, a collision was most probable owing to the imperfect brakes then available. To-day the tendency is to replace as much of the signalling apparatus as possible by automatic or semi-automatic installations. First of all, from the ordinary telegraphic instruments came the block signalling, in which there is always a clear section between two following trains. Next came the lock and block, which interlocks the signals and telegraphic instruments, and so forces the signalman to maintain that section unoccupied. This is the system in most general use to-day. Lines with very intense traffic, however, require something better, which is found in automatic signalling, whereby the trains themselves automatically work the signals behind them. This, coupled with a trip-catch for applying the brake, makes it possible to run forty-five trains per hour on the London Underground. Automatic signals are worked electrically by means of a track circuit, and are kept at danger behind a train until it has passed out of the section. The salient advantage of automatic signalling is that it allows of the number of block sections being increased, thereby speeding up train movements without involving the expense of installing extra signal-boxes. Electric colour light signals of the searchlight type are used for both night and day operation.

They have great penetrative powers in fog and mist. Increasing use has for some time been made in all the Brit. systems of electric colour light signalling. Progress has also been made in the power operation of points and manual levers are being superseded by miniature levers operating electric circuits. The most effective solution to the problem of fog working is through automatic train control, whereby the position of each signal on passing is indicated to the driver by either an audible or visual signal in the engine cab. The G.W.R. had, by 1939, extended its system of automatic train control over the whole 2800 m. of main-line routes from London to Penzance, Chester, and Fishguard.

On single lines it is necessary to prevent collisions not only between following trains, but also between opposing trains. At first, each section of the line had a corresponding 'staff,' and no engine was allowed in a section unless its driver had the staff in his possession. But sometimes a staff might get left at one end of a section, when a train wanted to traverse it from the other. Nowadays the electric staff is used; there are sev. staffs for each section, but they are kept in special machines at each end, which are electrically interconnected so that not more than one staff at a time can be removed from the two machines. The staff machines also lock the signals. Formerly signal-boxes were independent units, responsible only to the station-master, and dealing with traffic as it came along. Nowadays 'train control' is largely installed, by which signalmen are still responsible for the area covered by their boxes, but they report to and receive instructions from a central office called 'Control,' which has a bird's-eye view of the whole line, and can decide better than the signalman which trains to let by, and which to hold up.

ECONOMICS.—The only justification of railway making (in Britain before the Transport Act, 1947) is economical haulage, which term implies both mechanical power and concentration of load. The provision of the former naturally falls on the railway company, as being beyond the means and requirement of an individual carrier, and in practice the R. nearly always perform the carriage of passengers, except in the cases of the Compagnie Internationale des Wagon-Lits, the Pullman Company, and of certain other instances. In the case of mineral traffic in England it was usual for the wagons to belong to the private owner, but when on the railway they were in entire charge of the company. When speaking of a railway company and its general merits, it must be considered in three lights: (1) As owning the road, (2) as owning the rolling stock, and (3) as a carrier of all sorts of traffic. This combination differentiates a railway company and its charges from all other modes of transport and the charges usually in force. Steamship companies have not to provide the road, omnibuses use roads provided by taxation, so did stage-coaches; canal owners and turnpike trusts merely pro-

vided the road. Hence railway rates have to cover interest on capital spent, together with charges on current expenditure.

Taking only round figures of Eng. R., before nationalisation, as illustrative of railway working throughout the world, it will be found that the money actually spent on the lines and their miscellaneous property, like hotels, steamers, etc., was well over £1,200,000,000. To show for this the R. possessed about 20,000 m. of line and approximately 1,000,000 vehicles, including over 20,000 locomotives. Of this large sum about £900,000,000 represented irrecoverable capital because, after paying all preliminary expenses, if the line was of no use *qua* railway, it was of no use for anything else; none of the 'way and works' could be moved elsewhere: viaducts, bridges, platforms, etc., were all fixtures, and even the buildings were too specialised to admit of any other use. But once made the ann. expenses were low, as some £15,000,000 served (1939) to keep in repair these large capital works. With regard to the huge sums invested in rolling stock it may be noted that, though a railway has to be complete at the time of opening, the full amount of stock need not be provided till the traffic requires it, as additions can be made without much difficulty. But against this fact must be put the necessity of providing enough stock to meet the maximum demand. This maximum requirement probably only exists for a limited period in the year, so that during this period the vehicles should earn enough to cover, in addition to current expenses, the capital charge of their construction. For this reason the R. found it profitable to run cheap excursions during the rest of the year, so as to employ vehicles which would otherwise be standing idle. The earliest lines, as has been seen, were merely mineral lines, carrying no passengers. The first passenger line was the Liverpool and Manchester, opened in 1830. Although it was primarily promoted to carry goods, the passenger traffic was so heavy that at first the goods were crowded off the roads. In 1845, when most of the trunk lines were opened, 75 per cent of the revenue came from passengers, and on some lines, like the London and Birmingham and G.W.R., it was as high as 85 per cent. In 1939 the ratio was changed and the average of goods and passengers was 55 per cent and 37 per cent respectively, the other 8 per cent coming from canals, hotels, etc. In the forties passenger traffic consisted of well-to-do people, customers of the post-chaises and stage-coaches paying an average fare of fully 2d. per m. Seventy years later 90 per cent travelled third class at an average fare of under 1d. per m.

During the First World War, and, later, owing to the increase in competition from motor-drawn vehicles, such a serious change took place in railway economics that most of, if not all, the old methods of statistical calculation were no longer the precise guides by which future policy could be shaped. In consequence many bigger

issues, which at one time could have been ignored, were then necessarily brought into any consideration of the subject. One of these was the important subject of railway expansion. The principle has been expressed that when the provision of new R., such as the recent extension of tubes in London, is necessary for the public, the public must provide the fund, or join in some guarantee to those who do so. Again the formation of a Ministry of Transport, and the active part that that ministry took in the arrangement of London traffic in particular, was a reminder both to the R. and the general public that there were mutual obligations, and whatever happened the public must be served. The nationalisation of Brit. R. was the culmination of this line of development. A third point that has a great deal of significance is the growing belief that the steam-drawn train with all its brilliant hist. belongs to a vanishing period.

Ann. expenditure by the R. of Great Britain has risen greatly since 1913 owing to the wage and price increases. In 1923 expenditure was about £157,000,000; it decreased subsequently and was £139,000,000 in 1930, £142,000,000 in 1933, and, just before the Second World War, it was £148,000,000. In 1948 it was £311,000,000. Gross revenue is the total income from all kinds of traffic and revenues which are derived from ancillaries; net revenue is the total gross receipts minus working expenses; and the proportion of the receipts absorbed by working expenses is known as the 'operating ratio.' In 1913 this ratio was 65 per cent, in 1939 about 90 per cent, and in 1948 92 per cent. The Railways Act, 1921, limited the ann. revenue that might be earned by the four groups to approximately £50,000,000. This standard revenue was based on 1913 revenues, but minor adjustments could be made from year to year. In 1937 railway companies were authorised by the Railway Rates Tribunal (now Transport Tribunal) to increase their charges by 5 per cent in order to bring railway revenues nearer to the standard.

Financial results for 1948 show the following figures: total gross receipts £337,314,996 (passengers £122,572,809, freight, parcels, and mails £211,064,189; miscellaneous £3,677,998); total working expenses £311,057,259; net traffic receipts £26,257,737. The Transport Commission as a whole, however, showed a deficit on net revenue account at Dec. 31, 1948, of £1,732,824 (£2,474,128 being provided for redemption of Brit. Transport Stock). The position in 1949 was still more unsatisfactory; a revenue deficit of over £20,000,000 was expected, and the commission reported that, unless immediate action were taken, an accumulated deficit of between £50,000,000 and £60,000,000 could be forecast. Railway charges were only 55 per cent more than before the Second World War, whereas costs were more than doubled.

In the U.S.A. the great transcontinental R. had been given princely domains by the U.S. Gov. Every alternate section along the road was theirs. In all

116,000,000 ac. had thus been given away. The Union Pacific received 20,000,000, Santa Fe 17,000,000, and the Northern Pacific 44,000,000. But the R. were entirely dependent on business, and there was no business unless these and other tracts were settled with people consuming manufactured products and raising crops for the E. markets and for export. The great roads, therefore, scoured the E. part of the U.S.A. and Europe with a view to inducing people to settle in the wilderness of plains. They offered them cheap transportation, and land at from \$1 to \$10 an acre. In this way the empty spaces began to be filled with people. The states and ters. began to grow. The hunger for more railway services increased. These were essentially the days when popular favour ran high. States and ters. granted the R. exemption from state taxes and further land grants, and bought stock in the companies in order to induce them to extend their lines. Tns. and cities, desiring to have railway connections, gave them free sites for stations and tracks and also subscribed for their stock. But this period of mutual goodwill was soon followed by an era of intense bickering. The R. were guilty of various abuses. There were stock-watering and other financial manipulations. In many instances exorbitant freight rates were charged. Free passes were given to members of the state legislatures to influence their attitude on various Bills. Freight rebates were given to favoured concerns. By entering state politics railway managers prevented just taxation and regulation. Finally the state of Illinois took the lead by the new constitution it adopted in 1870. It provided for a railroad commission to prevent unjust discrimination, and to fix maximum rates which might be charged. By 1874 Iowa, Minnesota, and Wisconsin had followed suit. The R. attacked the constitutionality of these enactments. In 1876 the U.S. Supreme Court held that when private property was affected with a public interest, it ceases to be private property only, and so was subject to regulation. The same day it decided in another case that it was perfectly legal for states to pass laws fixing the maximum rates for passengers and freight traffic. Later decisions, however, modified this position, and put the onus of the proof on the regulating bodies. These decisions, in fact, made it clear that while states could regulate commerce which was local in character, they could not touch it if it had in any way an inter-state character, and as most commerce was inter-state this put the issue squarely on Congress. The latter replied to this by passing in 1887 an inter-state commerce Act which prohibited pooling, freight rebates, and higher charges for short hauls than for long ones as was done in many flagrant cases, and required that all charges should be 'just' and 'reasonable.'

More important than these vague prohibitions and requirements was the provision in the Act for a Federal Inter-state Commerce Commission to supervise the

operation of the law. The Act was, however, long ineffective, but in 1903 Congress passed the Ellis Act, which once more forbade freight rebates and made the R. subject to prosecution and penalties. In 1906 the Hepburn Act made rate regulation possible by giving the Inter-state Commerce Commission power to fix them, subject to judicial review, but with onus of proof now on the railroads. It also forbade the giving of any passes save to bona fide employees of the R. or to the members of their families. In 1920 the new law enacted by Congress gave the Inter-state Commerce Commission complete power to make all rates, with a view to giving the shareholders a fair return on their investment and the public fair rates. This last law was passed as a measure of justice to the R. after the First World War. When the U.S.A. entered that war it took charge of all the R., and ran them practically as one system. The railway managers, upon getting their property back, claimed that immense harm had been done to their earning capacity. The law was the answer. But the law did not fix what Congress thought would be a fair return on the value of the railway property. For two years, therefore, Congress fixed it at 6 per cent, of which one-half of 1 per cent was to make provision for capital expenditures. Thereafter the Inter-state Commerce Commission was to decide the question. In 1922 this body fixed the return at 5½ per cent, and at that figure it still stood in 1940.

Another important section of the law of 1920 provided for the ultimate consolidation of all the railroads in the U.S.A. into a limited number of competing systems, the object being to reduce overhead expenses and to increase efficiency. The Inter-state Commerce Commission commissioned Prof. W. Z. Ripley of Harvard Univ. to prepare such a plan of consolidation. After various hearings the Inter-state Commerce Commission, on Dec. 9, 1929, announced its final plan, which provided for the consolidation of all the R. in the U.S.A. into twenty-one major systems. The railway managers of the R. serving part of the E. U.S.A. prepared a plan in accordance with this, whereby the four main competing systems should be the Pennsylvania, Baltimore and Ohio, New York Central, and the Chesapeake and Ohio-Nickel Plate system. This was not ratified by the Inter-state Commerce Commission, and some of the railroadists were proposed to incorporate in these systems did not fully agree to it. The New Deal (q.v.) came to the aid of the R., which had been hard hit by the great world economic depression of the 1930s, brought about consolidation of facilities, and financed long-overdue improvements.

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Raimondi, see MARC'ANTONIO.

Rain and Rainfall. Rain is the prin. form in which water falls from the sky. The complete physical explanation of the formation of rain is not yet understood. At all temps. water can exist in vapour form up to a 'maximum' or saturated vapour pressure which increases markedly with increase in temp. (being, in the presence of a plane water surface, 1.5 millibars (mb.) at 0° F., 3.7 mb. at 20° F., 8.4 mb. at 40° F., 17.7 mb. at 60° F. and 34.3 mb. at 80° F.). When this saturation pressure is exceeded the water vapour tends to condense into water droplets or ice particles; in the atmosphere, this is achieved by cooling the air either by contact with the ground when dew, frost, or fog are formed or by lifting and cooling by adiabatic expansion (because of the decrease in pressure), when first cloud droplets are formed, and later, as the upcurrent becomes insufficient to support them, solid or liquid particles which fall to the ground as drizzle, rain, sleet, snow, or hail. Since the saturation pressure in the presence of ice is lower than with water for given temps. below freezing, ice particles should form more easily than water droplets. However, another necessary condition is the presence of a nucleus, i.e. tiny particle of matter, on which the water vapour can begin to condense into a water drop or to sublimate into an ice crystal; this is because the surface tension over a small water drop requires a certain amount of super-saturation which is very large for the smallest droplets which must be formed first, and a nucleus gives the drop a flying start over the difficult first stages. Condensation nuclei are always present in the atmosphere but sublimation nuclei are of three kinds: a few on which ice crystals begin to form when the temp. falls below -10° C., many more on which ice forms below -32° C., and all other nuclei on which ice forms below -41° C. Although ice crystals have been observed in the atmosphere at temps. as high as -8° C., these values, which were discovered in the laboratory by Findeisen and Schultz, are considered fairly reliable; so that, between 0° and -10° C. clouds consist of super-cooled water droplets, between -10° and -32° C. of supercooled water droplets with a few ice crystals, between -32° and -41° C. of more ice crystals but still many more droplets than crystals, and below -41° C. of ice crystals only. Water

droplets and ice crystals thus formed are visible as cloud and tend to fall to the ground through the air. Because of air resistance the velocity of fall soon reaches a maximum and, if the rate of ascent of the air is greater than this, the cloud remains in place. Cloud droplets vary in size from a fog droplet of radius 10^{-3} cm. up to 10^{-2} cm. with corresponding maximum falling velocity from 2½ ft. per min. to 140 ft. per min. (i.e. less than 2 m.p.h.). Dr. T. Bergeron claims to have shown that these drops cannot grow or coalesce with each other and, in fact, that in the cloud at any one part they tend to become uniform in size, so that they can only fall as very small droplets (usually less than ½ mm. in diameter) which are known as drizzle. Bigger drops such as raindrops can only be formed, according to Bergeron, by condensation of water vapour on or collision with ice crystals falling at a different speed through the cloud. From this follows the theory that all rain-bearing clouds must extend into regions where ice crystals begin to form, i.e. well above the freezing level. Above this the drops on collision will freeze into sleet and hail, melting into rain as they pass into warmer regions. As they become larger they fall faster through the air, continuing to grow whilst within the cloud but tending to evaporate on passing through cloud-free dry air. The maximum velocity of fall of different sized raindrops for diameters 0.5, 1.0, 2.0, 3.0, 4.0, and 5.5 mm. is 10, 14, 19, 23, 25, and 26 ft. per sec. respectively; above 5.5 mm. diameter the maximum velocity no longer increases with size because of the change in shape caused by external pressure and viscosity, which also set up internal stresses and strains breaking the drop into smaller drops, so that raindrops are never observed larger than this nor do they fall to the ground faster than 26 ft. per sec. or 18 m.p.h.

Artificial Production of Rain.—Recently experiments have been made in Russia, America, Australia, and England to utilise the consequences of Bergeron's theory of the formation of rain and to produce the rain artificially by speeding up the growth of the droplets. The usual method is to dust the top of a suitable cloud with solid carbon dioxide (seeding as it is called). As these very cold particles pass through the cloud they form a large number of ice crystals which will fall through the cloud to produce rain in the normal way. If the whole of the cloud is below the freezing level then ice crystals will not persist for long before melting and only a very few (if any) raindrops will reach the ground. If the cloud reaches to such a height that the temp. at the top is below -10° C. then ice crystals will be formed naturally and rain will result naturally. Again, if the cloud top is overseeded, then most of the cloud droplets will be transformed into individual ice crystals and these will be too small to fall and produce rain; at the same time enough seeding must be done to produce a sufficient number of raindrops to overcome evaporation in falling to the

ground. Furthermore, the total quantity of water in any cloud is only sufficient to produce light rainfall for a very short period unless new cloud particles are continually being formed to replace those made to precipitate. Consequently the artificial production of rain is only possible as a trigger action, starting rain from clouds that only just fail to reach the ice-crystal-producing height. This was well illustrated in the Australian experiments, reported by E. B. Kraus and P. Squires in *Nature*, vol. clix., 1947, p. 489, when the seeded clouds grew rapidly in height showing that enough latent heat of fusion of ice was released to cause the cloud to become more buoyant, rise to the natural crystal-forming level, and to continue to produce rain for a long time. In addition to producing rain in favourable conditions it is also possible to seed a shallow stable layer of cloud sufficiently to cause all the cloud droplets to grow and fall to the ground or into evaporating regions, which might be useful in clearing persistent sheet cloud but cannot produce much rain. R. was 'manufactured' for the first time in Britain in Aug. 1949 by an R.A.F. bomber which seeded solid carbon dioxide into suitable clouds.

Distribution of Rainfall.—If the temp. is high then more water can be present as vapour in the atmosphere (because of the higher saturation vapour pressure) so that more water is available for condensation, and therefore heavier rainfall is likely in summer or in warm climates. Heavier rain is also more likely with strong up-currents, for then the water vapour is being condensed more quickly; consequently the more violent rain clouds such as cumulonimbus are likely to produce more intense rainfalls than the steadily rising sheet clouds, although since these are very widespread and all the air is being lifted instead of just the small area of the cumulonimbus cloud, their rainfall is usually prolonged with a heavier total rainfall over a large area. Mts. will accentuate the uplifting in both cases, and therefore heavy rainfall is typical of mountainous or even hilly regions. On the other hand descending air, because of the increase in pressure, is warmed adiabatically so that the air becomes unsaturated and the cloud droplets become smaller and evaporate, the rainfall being decreased considerably if not missing altogether. Thus mts. and even quite low hills exhibit a much increased rainfall on the exposed side and comparatively dry conditions on the lee side. This sheltering effect is referred to as a rain shadow. Depressions and anticyclones are regions of generally ascending and descending air, so that rainfall is prevalent towards the centres of low pressure and very rare in centres of high pressure. Thus high temps. (with high humidity), low pressure, mts., and nearness to the sea all contribute to high rainfall, whilst low temp., low humidity, high pressure, shelter from moist winds and remoteness from the seas contribute to low rainfall. In different places these conditions occur in different proportions, so that the prevalence of

winds from the sea may be balanced against low temps., high mts. against dry air as in Turkestan or S. Rockies, persistent high pressure against moist air as in the Azores, and high temps. against persistent land winds as in the Sahara or India during the N.E. monsoon.

This balancing of conditions is well illustrated in the Brit. Isles where the more stormy weather brings in winter about the same average rainfall as the warmer, not so stormy weather in summer. The average monthly rainfall (1881-1915) in the Brit. Isles, taken as a whole, is shown in the following table, reproduced from *Book of Normals of Meteorological Elements for the British Isles* by permission of the Director of the Meteorological Office.

	in.
January . . .	3.74
February . . .	3.26
March . . .	3.22
April . . .	2.52
May . . .	2.61
June . . .	2.64
July . . .	3.25
August . . .	3.88
September . . .	3.09
October . . .	4.25
November . . .	4.19
December . . .	4.72

Total for the year . . . 41.41

It will be noticed that Dec. is the wettest month, April the driest; Feb., traditionally 'dill-dyke,' is the driest winter month, whilst the popular holiday month, Aug., is the wettest summer month. Along the E. coast of England July and Aug. are in fact the wettest months of the year because of summer thunderstorms. But the rainfall over the Brit. Isles is very variable; in some months no rain fell over large parts of the country, notable dry months being Feb. 1891 for central and S.E. England, and Aug. 1948 for Scotland; and at Ballabus in Islay rain fell every day for 89 days from Aug. 12 to Nov. 8, 1923.

A belt of heavy rainfall extends along the region N. and S. of the equator, bounded on each side by regions of drought in the lats. of Cancer and Capricorn. The trade wind regions are not rainy. The regions of the westerlies, N. and S., are marked by cyclonic disturbances and good precipitation, the polar caps again being comparatively dry because of low temps. This general scheme is greatly modified but not obliterated by the distribution of land and water. The trade winds striking the E. coasts of the continents make them regions of rain, especially in summer, the W. coasts, where they leave, being dry. Australia, Africa, and S. America are good examples of this. In the region of the westerlies of the S. hemisphere, the W. coasts are rainy and the E. drier; in the N. hemisphere the W. coasts are rainy towards the N., e.g. Europe and Brit. Columbia, the E. coasts more to the S.,

e.g. China and U.S.A., where the trades are drawn into the continents by the formation of summer cyclonic areas. The interiors of the two great N. land-masses are regions of slight rainfall, but the heat of summer causes them to form draughts from the ocean, adding a further complication to the planetary scheme; and in winter they form the centres of anticyclones, with dry winds flowing out over the oceans. This action predominates in the Far E., where S.E. Asia, the monsoon region, gets summer rains and winter drought. Certain regions are marked by uncertain rains and droughts, e.g. the Deccan in India, W. New S. Wales and Queensland, and parts of S. Africa and S. America; places lying on the boundary of rain shadows or where conformation of land renders them particularly sensitive to alterations in strength of wind. The swing of the sun from Cancer to Capricorn and back again in the year produces a sympathetic change in wind systems, giving seasonal variations in rains: within the tropics the 'run follows the sun.' The westerlies produce more rain in the winter, when their cyclonic eddies are more intense; winter rains are characteristic of 'Mediterranean regions,' 28-40°, which are influenced by trade winds in summer, but are fringed by the westerlies in winter, e.g. Cape Prov. and W. Australia; the E. coast of S. India, of Ceylon, and the Indo-Chinese peninsula get rain with the N.E. monsoon when the main region is dry, and they are drier during the S.W. monsoon. Over the ocean the heaviest rainfall occurs in the Pacific Ocean between the E. Indian Archipelago and the Ladrões; on land it is found where the winds from the warmer oceans encounter high mts. near the coast, e.g. Nigeria, W. Indies, Burma, etc. Cherra Punji (Assam) has a mean ann. rainfall of 461 in. (40.8 in. were recorded on June 14, 1876); Mahabuleswar, near Bombay, 260 in.; while in the track of the westerlies, New Zealand, S. Chile, Norway, and N.W. America show similar conditions.

Heavy rainfall, as we have seen, is associated with strong updrafts; these are typical of intense cyclones and thunderstorms; such heavy falls in England have included 1.25 in. all within 5 min. at Preston, Lancashire, on Aug. 10, 1893; 2.90 in. within half an hour, at Cowbridge, Glamorganshire, on July 22, 1880; 3.63 in. in 1 hr. at Maldenhead on July 12, 1901; 4.65 in. in 2½ hrs. at Campden Hill, Kensington, on July 16, 1917; and as much as 8 in. in 5 hrs. near Bridgewater on Aug. 18, 1924; the greatest fall in one day in Britain was 9.56 in. at Bruton, Somerset, on June 28, 1917. Abroad, 30.11 in. fell at Gibraltar on Oct. 25, 1836, and at Baguio in the Philippines a typhoon between July 14 and 17, 1911, deposited 35, 29, 17, and 8 in. respectively, a total of 89 in. in four days, 45.99 in. falling within 24 hrs. on 14th-15th which is the world record. On mt. ranges the rainfall has a maximum at a varying height depending on the wind current of the season; in the Alps this is 3000-4000 ft. in winter,

6000-7000 ft. in summer; in the mt. stations of Hindustan the height is about 4000 ft.; in the Eng. Lake Dist. over 1000 ft. The level above which the rainfall decreases has been named by Supan the inversion level.

See also METEOROLOGY; SNOW. See Meteorological Office, *Book of Normals of Meteorological Elements for the British Isles*, Section V., 1924; Royal Meteorological Society, *Rainfall Atlas of the British Isles*, 1926; C. E. P. Brooks, *Climate*, 1932; T. Bergeron, *On the Physics of Cloud and Precipitation* (Report of the Meteorological Association, Union Géodésique et Géophysique International, Lisbon), 1933; K. G. Bilham, *Climate of the British Isles*, 1938; U.S. Weather Bureau, *Record Rainfalls of the World in Monthly Weather Review* (vol. lxi., p. 356), 1941; E. E. Foster, *Rainfall and Runoff* (New York), 1948; W. G. Kendrew, *Climate*, 1949; I.M.S.O., *British Rainfall*, (ann.).

Rainbow Corner, the corner of Shaftesbury Avenue and Great Windmill Street, London, on which stood the Amer. Red Cross club during the Second World War. In 1949 a plaque, bearing the name R. C., was erected by the Fellowship of U.S.-Brit. Comrades as a tribute to all ranks of the U.S. services who knew the original R.C.

Rainbows are caused by refraction and internal reflection of light from the sun upon raindrops. The first explanation of the rainbow was given by Descartes in 1637 depending on geometric optics. Using Snell's law of refraction he found that of 10,000 parallel rays striking one side of a spherical raindrop, after refraction on entering, one internal reflection at the opposite side and refraction again on leaving, those between 8500 and 8600 all had an angle of deviation within a few minutes of the minimum angle of deviation. There is therefore a narrow concentrated beam of light emerging from the raindrop at the minimum angle of deviation, which, as the colours are dispersed, gives a coloured spectrum, red, orange, yellow, green, blue, indigo, violet, the red having an angle of deviation of about 137°, the violet 139½°. Thus, all drops on a cone centred about the shadow of the observer at an angle of about 42° will appear bright in the sunlight, the colour varying from violet at about 40½° to red at about 43°. The bow cannot be seen from the ground if the sun is at a greater elevation than 40° unless viewed from a height it is less than a semicircle, whilst from an aircraft the bow can sometimes be seen as a complete circle. This is the primary bow.

With two internal reflections, as in Fig. 3, the raindrops will reflect a secondary bow, at angles from about 50° for red to 54° for violet. With three or four internal reflections the bow would appear between the sun and the observer, but they are not seen because the directly transmitted light is much stronger than the concentrated beam after so many internal reflections. With five and six reflections the bows would appear near the

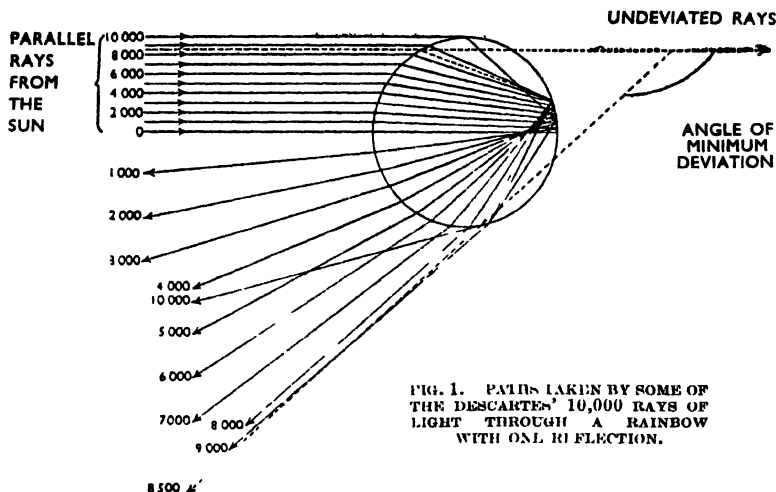


FIG. 1. PATHS TAKEN BY SOME OF THE DESCARTES' 10,000 RAYS OF LIGHT THROUGH A RAINBOW WITH ONE REFLECTION.

primary and secondary bows if they were not too faint to be seen.

This explanation, due to Descartes, explains many of the R. seen, but on occasions some of the colours are missing, and the bow may not even be part of a true circle. A better explanation, from the wave theory of light, shows that, so far from there being a simple intense beam of light along the 'Descartes' angle of minimum deviation, the beam forms two foci very close together, the waves from which interfere and reinforce one another alternately along sev. angles, the most intense being almost along the Descartes angle. The other reinforced rays are on the violet side of the primary angle and the bows which they form are sometimes seen as supernumerary bows. The position and distance between the two foci (which depend on the drop size) determine

the angle of these bows; if the colours of a second bow begin before those of the first finish, the colours mix, so that the rainbow does not have its normal colour sequence. The primary angle also depends on the size of the drop, being less than the Descartes angle and closer to it the larger the drop; it is sev. degrees less for very small drops. If, therefore, the drops within the sunlight are of different sizes in different parts of the bow, it will be both out of shape and with differing colour sequences. With large drops the red of the first supernumerary coincides with the green of the primary so that the yellow band is wider than normal. With smaller drops the first colour is no longer red but orange; with still smaller drops it is yellow; other colours appear such as pink just inside the violet. With very small fog droplets a bow is sometimes seen

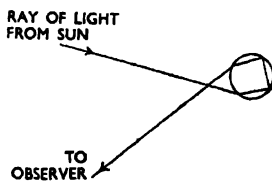
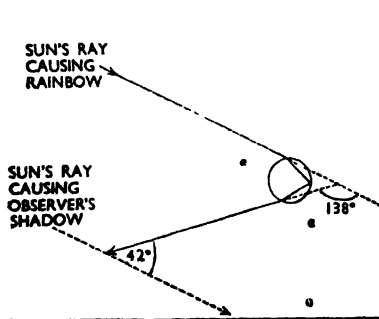


FIG. 3. PATH OF RAY OF LIGHT THROUGH RAINBOW TO FORM A SECONDARY RAINBOW

FIG. 2. HOW THE RAINBOW IS FORMED AT AN ANGLE OF ABOUT 42° FROM THE 'SHADOW OF THE OBSERVER'

which is white with a faint coloration at the edges—the fog bow. Lunar R. are also seen, but as a general rule the light is so faint that, to the eye, it appears white. See J. M. Perntner and F. M. Exner, *Meteorologische Optik*, 1910, and R. W. Wood, *Physical Optics*, 1911, 1934.

Rainerius, see PASCHAL (popes), *Paschal II*.

Rainfall Stations, see under METEOROLOGY.

Rainford, par. and urb. dist. of Lancashire, England, $4\frac{1}{2}$ m. N.W. of St. Helen's. The dist. is mainly residential, but the manuf. of earthenware drain pipes, from clay mined in the dist., has been carried on for nearly a century. Pop. 5000.

Rain-gauge. Rain is collected for measurement in a R. It is usually made of copper, the upper detachable cylinder containing a funnel, above which it rises considerably and terminates in a clean-cut edge 5 or 8 in. in diameter. The measuring-glass is graduated to show the amount of rainfall to the nearest tenth of 1 mm. or hundredth of 1 in., and tapers towards the bottom to show small amounts. Many precautions are necessary as to the placing of the R., for which see works on meteorology; the most important precaution is the selection of a perfectly open slope to catch the rain from every direction, far enough from the ground (best covered with short grass) to prevent splashes bouncing into it, and yet not so far from the ground that in a high wind its own eddies blow away some of the rain. Brit. practice is to place the R. at a distance from any object more than twice the height of the object and with its rim 1 ft. above level short grass. Self-recording Rs. are in use; these work by means of a float and style tracing on a revolving barrel, or are emptied at definite points by siphons or overturning of the collecting vessels. See *Meteorological Observer's Handbook*, 1942 ed.: H.M.S.O., 1946.

Rainham, suburb of Gillingham, Kent, England, 4 m. E. of Rochester. Rom. remains have been found here. Pop. 3900.

Rainier, or Tacoma, volcano in Washington, U.S.A., in the Cascade range, 14,408 ft. high. It is considered to be extinct, although fumes are sometimes given off from it.

Rain-making. Among peoples of primitive culture, notably in E. Africa, W. Africa, and (at one time) Australia, R. is the purpose of various rites and usages, practised by professional rain-makers, who are generally important individuals in their community (see on this especially Nilotics; SHILLUK). Formerly the Garpugares, i.e. 'rain-makers', formed a distinct caste in many Maharratta vils. of Central India. More widely prevalent than astrology and far more ancient, the art of 'controlling' the weather, and particularly the rain, survives when society rises to higher levels, becoming, as indicated above, the function of the most eminent wizards and priests. Rain-rites being very apt to fail of their purpose the

wizard runs the risk of losing his reputation or of some worse fate. His attention is therefore drawn to the signs of the weather, the character and course of the seasons, the connection of rain with the aspect of the sky and the direction of the wind, so that he learns to operate for rain only when rain may reasonably be expected. He has in fact familiarised himself with the rudiments of meteorology, but by observation rather than by *hocus pocus* (see C. Read, *Man and his Superstitions*, 1925). For scientific methods of R. see RAIN and RAINFALL, *Artificial Production of Rain*.

Rainy Lake, N. America, 120 m. from Lake Superior, and part of the boundary between Canada (Ontario) and the U.S.A. (Minnesota). Length 40 m., breadth 3 to 8 m.

Raipur, headquarters of a dist. of the same name in Central Prov., India, and until 1947 of a political agent for the Feudatory States, 188 m. E. of Nagpur. It has an extremely strong fort dating from 1460, and trades in cotton and grain. Pop. of dist. 1,516,700; of tn. 63,500.

Rais, Gilles de Laval, Seigneur de, see RITZ.

Raised Beaches, see BEACHES, RAISED.

Raisins, name given to the grape when dried. Quantities of R. are exported from the Mediterranean shores, while others come from France, Smyrna, and California. The variety known as muscatsels is dried while partly attached to the vine, and is grown near Malaga. The process of drying takes place in the sun or in specially heated houses.

Raismes, comm. of the dept. of Nord, France, 5 m. from Valenciennes. It has steel works and mechanical engineering. Pop. 12,200.

Rajagopalacharia, Chakravarti (b. 1879). Indian lawyer and statesman, b. at Hosur, Salem dist., India, son of Chakravarti Venkatarya and Singarenma. He was educated at Central College, Bangalore, and at the Presidency College and Law College of Madras, and practised law at Salem, India, from 1900 to 1919. An ascetic Brahman, known as 'the Tamil Mahatma,' he was closely associated with Gandhi from 1918 and joined Gandhi's non-co-operation movement, 1919-20. A prominent member of the right wing bloc of Indian nationalists, he was general secretary of the Indian National Congress, 1921-22, and a member of its working committee, 1922-47. He advocated economy in administration and supported prohibition—being secretary of the Prohibition League of India in 1930. R. underwent imprisonment in connection with the Indian Freedom movement sev. times between 1921 and 1942. From 1937 to 1939 he was Prime Minister of Madras prov., and in 1940 he induced All India Congress to offer co-operation in the war effort. He was a member of the interim gov. of India, 1946-47; governor of W. Bengal, 1947-48; acted as governor-general of India in 1947; and was governor-general in succession to Earl Mountbatten of Burma, from June 1948 to Jan. 1950, when India became a republic. His puba.

are *Marcus Aurelius and Socrates in Tamil; Tamil Mahabharat in Story Chapters; Upanishads for Lay Readers; Bhagavad Gita Selections and Notes* (1923-42); *Fatal Cult and Other Stories and Prohibition Manual* (1935); and *Way Out and Reconciliation* (booklets, 1942).

Rajah, or (better) **Raja** (from Sanskrit *rajan*, king; cf. Lat. *rex*), title borne by a Hindu prince. Other forms of R. are *rao*, *rana*, and *raual*. The title of the Hindu emperor of Vijayanagara in S. India was *raya*. Rs. have been in existence in India from very early times; the title was hereditary as a rule, whilst men of conspicuous valour and wisdom were also elected Rs. Chiefs of greater importance than the ordinary Rs. were called *maharaja* (*maharas*, *maharana*), or great R. The Brit. Gov. recognised in many cases the sovereignty of Rs., who were allowed to rule over their own ter., and to transmit the title to their heirs. Hindu subjects of eminence, great landowners, subject princes, etc., were also called R., having the title conferred on them by the Brit. Gov. for life.

Rajamahendri, tn. and important river-crossing in the dist. of Godavery, Madras, India, on the Godavery R., 45 m. N. of Masulipatam. It manufactures carpets, woolen goods, etc. R. was occupied by the Fr. from 1753 to 1758. Pop. 60,000.

Rajasthan, or the United State of Rajasthan, union of sixteen Rajput states, forming (next to Madras) the largest single political unit in the dominion of India. It is practically co-terminus with the former collection of states known as Rajputana (area 132,559 sq. m.; pop. 13,670,000) and has an area of 121,000 sq. m. and a pop. of over 12,000,000. R. came into existence as a political unit in April 1948, but apart from Udaipur (13,170 sq. m.; pop. 1,927,000), the most ant. and honoured of Rajput states, it then included only nine other smaller states. By the date of the new state's formal inauguration (March 30, 1949) by Sardar Vallabhai Patel, deputy Prime Minister of India and minister for states, it included four of the largest and most powerful Rajput states, namely Jaipur (15,610 sq. m., pop. 3,041,000), Jodhpur (36,120 sq. m., pop. 2,556,000), Bikaner (23,181 sq. m., pop. 1,293,000), and Jaisalmer (16,000 sq. m., pop. 93,000). Thus, for the first time in the hist. of a colourful and proud people, it welded nearly all the Rajputs and their Jat peasantry into one entity. This union, the most notable achievement of the states ministry of India in Delhi, was not brought about without difficulty. There were jealousies and rivalries, not only between the princes, with their thousand-year-old lineages and their feudal barons, or *jagirdars*, with their ant. privileges which they sought to preserve, but also between the new democratic leaders of the Congress party in the various states. But the strong hand of Delhi prevailed on them to compose their differences and to choose one leader as Prime Minister of united R. on whom should devolve the responsibility of distributing appoint-

ments between the Congress party workers in all the component states. The maharaja of Jaipur was selected to be Rajpramukh (roughly governor) for life of the new union and the former Rajpramukh of the first union was granted the honorific title of Maharajpramukh. The smaller Rajput states of Alwar, Karauli, Bharatpur, and Dholpur were merged in March 1948 with the new Matsya union, but of these the first two were merged later with R., and the latter two with the United Provs. to which their ters. were adjacent.

The Aravalli range of mts. stretches across the middle of the country, the land E. and S.W. of these being fertile and possessing stretches of forest and rich soil. In the N.W. sandy, ill-watered plains make the country unproductive and difficult to cultivate. The chief rvs. are the Chambal and the Banas. The former is the largest, 560 m. in length, flowing into the Jumna. The only natural lake is Sambhar, whose water is salt. Sev. large artificial lakes have been constructed for the purpose of storing water. Cattle are extensively reared, and grain, wool, cotton, and opium are the staple products. The climate is hot and dry in summer and bitterly cold in winter. R. is said to be the healthiest part of the sub-continent of India. The people are mainly engaged in agriculture. The Rajputs (g.p.) were formerly the ruling class, and Rajasthan is the chief language of the country.

Rajbansi, see Korch.

Rajkot, cap. of the state of R. in the Kathiawar peninsula, Bombay, India, 110 m. W. of Cambay. Among its buildings is a college for the sons of native chiefs. It was formerly the residence of the E. Kathiawar political agent. Pop. (state) 104,000; (tn.) 16,000.

Rajpur, tn. in the dist. of Twenty-Four Parganas, W. Bengal, India, 12 m. S.E. of Calcutta. Pop. 11,200.

Rajput, race of India, spread over the N. of the country and not confined to Rajputana. The Rs. claim to be the descendants of the Kshatriyas. Their early hist. is obscure, but they appeared in the eighth century, and spread into the Punjab, Kashmir, and the Central Himalayas. Their unity was destroyed at the Moslem conquest. The majority adhere to the Hindu religion, the remainder are Muslims. They are a fine race, noted for their courage and their pride; none but the poorest will humiliate himself by performing manual labour. No occupation except arms or governing can be followed by them. They are divided into clans; the prin. are the Rahtor, the Kachwaha, the Chauhan, the Jadu, the Sisohyas, and the Ponwar. Roughly the whole number of Rs. in India is 10,000,000.

Rajputana, name given, before the partition of India, to a collection of more than a score of native states and one chiefship, bordered on the N. by the Punjab and lying between the United Provs. and the former Bombay presidency. See RAJASTHAN.

Rajput Painting, see INDIA (INDIAN ART).

Rajshahi, former div. and dist. in Bengal, India, situated to the N. of the Ganges. R. was divided between India and Pakistan in 1947. The Pakistani R. div. has an area of 13,488 sq. m. and a pop. of 9,482,000. India received 6164 sq. m. with a pop. of 2,557,000. The dist. of R. went to Pakistan; area 2526 sq. m.; pop. 1,571,000.

Rakaanga, or **Rierson Island**, is. in the Manihiki group, Pacific Ocean, included in the Cook Is. (annexed by New Zealand). Pop. 300.

Rakiuru, see STEWART ISLAND.

Raleigh, Sir Walter (1552-1618), Eng. courtier, soldier, explorer, founder of colonies, and author, b. at Hayes Barton Farm, Budleigh, Devonshire. His family



SIR WALTER RALEIGH

were of the gentry class, and he was related to Sir John, Sir Humphrey, and Sir Adrian Gilbert on his mother's side. His name is variously spelt in thirteen different ways, including R., Raleigh, Rawleigh, Rawley, Ralego, Reali, etc.; but the orthography of R. himself is 'Ralegh.' Richard Hooker and Lord Bacon both agree that he studied at Oxford, and Anthony Wood records in his *Athenæ Oxonienses* that R. became a commoner of Oriel College about 1568 and that, under an excellent tutor, he was 'the ornament of the juniors and was worthily esteemed a proficient in oratory and philosophy.' In 1569, however, he went to France as a gentleman volunteer of the Huguenot army, being present at the battles of Jarnac and Montcontour. In 1577 he served under the prince of Orange in the Netherlands. On his return he joined Sir Humphrey Gilbert in the latter's expedition under a royal patent to plant settlements in N. America. Although the expedition was not successful, R.'s active interest in the field of exploration and colonisation dates from this

time. When the rebellion in Ireland broke out in 1580 R. received a captain's commission under Lord Arthur Grey, lord deputy of Ireland. R.'s name is associated with the merciless massacre of the greater part of the Sp. and It. garrison of Fort del Oro at Smerwick in Kerry, where they were besieged by Grey. It was on his return from Ireland that Leicester, his patron, gave him the chance to appear at court. The story of R.'s gallantry to the queen in throwing his cloak to the ground for her to walk over may indeed be true; but his first introduction to court is rather to be ascribed to Leicester. R. possessed the indispensable accomplishment of an Elizabethan courtier, namely, the art of flattery, in a high degree, and his brilliant qualities and high mental endowments contributed to his rapid advance in the queen's favour. In the course of a few years he was knighted, made lord warden of the Stannaries, captain of the guard, and lieutenant-general of the co. of Cornwall (1587). He also received the valuable grant of the forfeited lands of the earls of Desmond and a lucrative patent for wine-vendor's licences. These marks of favour naturally exposed him to envy at court. According to Wotton it was Leicester, R.'s former patron, who extolled the rising talents of the young Essex to counteract R.'s increasing influence with the queen.

Meanwhile, in 1581, R. was again thinking of colonisation. He drew up a plan for colonising what is now Virginia and Carolina (he named Virginia in honour of the Virgin Queen) and laid it before the queen and her council for approval. On March 25, 1584, the queen granted him letters patent 'to discover, search, find out, and view such remote heathen and barbarous lands . . . not actually possessed of any Christian prince, nor inhabited by Christian people' (Hakluyt's *Voyages*, vol. iii.). On April 7 two vessels, fitted out at the cost of R. and of his associates, sailed round the W. Indies and Carolina and their report induced R. vigorously to prosecute his design of planting a colony in Virginia. A fleet under R.'s cousin, Sir Richard Grenville, planted a settlement at the is. of Roanoke, but mismanagement led to great distress among the settlers. By 1588 R. had spent £40,000 upon his colonial enterprises and the experience taught him that so great a design could not be carried out by a single individual. He therefore assigned his patent to a company of merchants, reserving to himself a fifth part of the gold and silver ore raised. It also joined in the enterprise to find the N.W. Passage, the conduct of which under (Capt. Davis (*q.v.*)) resulted in the discovery of Davis Strait. A successful privateering expedition to the Azores in 1586 was carried out in pinnares fitted out at R.'s expense. R.'s fame now extended far outside England; he was known not only as the promoter of maritime discovery and the founder of colonies, but also as a patron of science in general. Hakluyt (*q.v.*), who pub. his *Voyages* in 1582, sought the acquaintance of R. and acknowledges him as one of those

benefactors 'from whom he received his chief light into the western navigations'. About this time R wrote some of his treatises on military operations. Probably R took no direct part in the fight against the Sp Armada in 1588: he was, however, a member of the council of war which met to consider the best means for securing England's safety, and helped to draw up the final plan of defence.

R then suggested attacking the Sp in the W. Indies by a daring interception of the Sp. Plate fleet. R was given a commission as general of the fleet which was to conduct this operation. In 1592 he sailed but was overtaken by Frobisher with letters from the queen recalling him. He continued on his course but after a storm off Cape Finisterre, which scattered the fleet, he resolved to obey the queen's orders and returning to England, was sent to the Tower by his jealous sovereign to atone for his intrigues with the beautiful Elizabeth Throckmorton who eventually became his wife.

During his period of exile from court he matured a project for a voyage to Guiana. It is difficult to assign the motives which first induced him to take this step but Naunton (q.v.) states that, finding his favour declining, his imagination suggested the discovery and conquest of a second empire of the Incas, which would not only invest him with the fame that his restless ambition desired, but restore him to favour at court and fill his exchequer from the wealth of El Dorado, in the existence of which he believed as fully as did most of his contemporaries. He therefore devised his famous voyage in search of El Dorado or Manoa and after his return from Guiana published his celebrated *Discovery of Guiana*, a narrative which still fascinates by its persuasive style, though R's statements about El Dorado, the tribe without head, and other phenomena are proof of the gullibility which made him too ready to listen to the quack as well as to the genius.

Restored to the favour of the queen, he was appointed an admiral in the expeditions to Cadiz, 1596 and in the following year was engaged in an attack on the Azores, in both of which he added greatly to his reputation. The death of Elizabeth, however, was the turning point in his fortunes. The new sovereign and his old enemies combined to bring about his downfall. In a secret correspondence with the Scottish king before the death of Elizabeth, Sir Robert Cecil succeeded in impressing James with a belief that R was unfavourable to his succession. James had already been prejudiced against R by the earl of Essex. R was dismissed from his post as captain of the guard, and absurdly charged with complicity in the Sp. plot or Lord Cobham's treason which planned to dispossess James of his crown, and to place his cousin, the Lady Arabella Stuart, upon the throne, with the aid of Sp. gold. R's trial took place in 1603. He defended himself with eloquence and force, but in vain, for Coke, the attorney-general, conducted the trial on behalf of the Crown in a manner scandalous even by

the standards of the age. The trial is fully reported in Haigrave's *State Trials*, vol. 1.). The subservient jury returned a verdict of guilty, and R was sentenced to death.

Although his estates were confiscated, the capital sentence was not at that time carried out, and R spent the next twelve years in prison. During his confinement he spent much time in chemical experiments and research, but most of his intellectual energy in this period was bestowed upon the conception and composition of his *History of the World*. Reflective in manner and dignified and grave in style this work is one of the finest specimens of Elizabethan prose and shows the finest side of R's character.

Eventually what impartial intercession could not effect was achieved by an appeal to the king's greed. It is probable that the idea of the existence of a great goldmine in Guiana from which appreciable benefits might be reaped, induced the needy James to listen eagerly to Sir George Villier's intercession prompted by a bribe of £1500. R was released in March 1615, and at once made every preparation for his second voyage to Guiana, promising the king that he would not interfere with the Sp settlements. Like the first it failed of its object. He had embarked in it his remaining fortune and lost both that and his eldest son Walter, who was among the fallen at Santo Thomé. R's ill health had prevented him being an effective leader of this expedition to the Orinoco, and Lawrence Keymis his old associate and deputy did nothing more than burn the Sp settlement. On R's return to England in 1618 a broken and dying man, the Sp ambas demanded his punishment for the outrage. R met with no pity from James, who had him beheaded on Tower Hill on Oct. 29, 1618. The 'time of execution was contrived to be on my Lord Mayor's Day, that the pageants and fine shewes might draw away the people from beholding the tragedie of one of the gallantest worthies that ever England bred' (Aubrey's *Letters*).

R typified the spirit of his age and his career is a vivid illustration of the different facets which made up the Elizabethan court. It was primarily a courtier and a royal favourite. His important court connections made his voyages possible. Later ages over-emphasised R the explorer. His achievements in this field were of less importance than those of the Cabots, and of Willoughby and Chancellor. The Victorians extolled him as the founder of empire, but his own age saw him more accurately as a spectacular favourite. It was not a good coloniser. Ideas came to him rapidly, fantastic, daring, and over-ambitious, but he lacked the staying power and capacity for organisation to bring them to fruition, and his voyages had little lasting effect on colonial history. His enterprise was little more than greed. Like all his contemporaries he saw colonies as a ground for immediate exploitation, and, when they yielded no gold, lost interest in them. In his attitude to Spain he was simply a splendid pirate, though, indeed, without such pirates

England might well have perished. R. was a man of his time, and should be judged accordingly. Gullibility and superstition blended with a scientific thirst for knowledge and a mature philosophy. Great ideas emerged momentarily, to be lost in the constant, hectic desire to gamble all and sacrifice all for quick results; for at the court from which he derived his existence quick results were essential to maintain his position. R. never had the genuinely sentimental hold on Elizabeth which Leicester and Essex possessed, and he lacked the diplomacy and apparent servility which enabled Hatton to survive. He could flatter, but he was too arrogant to keep up the continuous flow of exaggerated compliments which Hatton, Elizabeth's 'Sheep's lids' could sustain. R. played with Elizabeth's orders more than once, and lacked the sense to crawl back into favour. His outspokenness made him James's enemy, and his egotism, obvious greed, and magnificence made the court afraid of him. In the atmosphere of cut-throat competition which marked the Elizabethan and Jacobean court, R. could only survive by direct favour of the ruler, or by entering into the game of faction directed by the Cecils. He did neither, playing, after his introduction to court, a lone hand. Elizabeth tolerated him because in her struggle with Spain, he could be useful, but R. was merely a danger to James's peace policy, and he had too much pride to maintain himself when he had outlived his usefulness. Essex could rely on some support in London, but R.'s contempt for the people robbed him of popular affection. R. was a magnificent failure, his career illustrating admirably the complexities, dangers, and callousness of court life. He possessed in great measure the qualities demanded of the system on which he chose to hazard his future. He had the courage, brutality, and greed to make him both an explorer and a Sp. menace, and the splendour, intelligence, and a genuine thirst for knowledge demanded by Elizabeth of all her favourites, but he lacked adaptability. His downfall is proof of the strength and ultimate supremacy of the court system built up by Elizabeth and Burleigh.

Of his literary accomplishments mention has already been made above. The pure and nervous style in which *The Discoverie of Guiana* (1596) is written gives it an enduring charm. Camden characterises it as an elegant production and it attracted such attention when it first appeared that it was trans. into the prin. European languages. It was reprinted in Hakluyt's *Voyages* in 1598, in T. Broth's *Works of Raleigh* (1751), in A. Cayley's *Life of Sir Walter Raleigh, Knight* (1805), and in *The Works of Sir Walter Raleigh, Knight, now first collected, to which are prefixed the Lives of the Author by Oldys and Birch* (Oxford, 1829). A few years after the pub. of the original an abridged Lat. trans. appeared in 1599 in Nuremberg at the cost of the geographer Levinus Hulsius. A literal trans. is also contained in De Bry's *Collection of American Navigations and Voyages* which was

pub. in Lat., Ger., and Fr. (1590-99). The original text is reproduced in the Hakluyt Society's reprint (1848), ably ed. by Sir Robert H. Schomburgk (q.v.) with a biographical memoir. R. possessed great talent for poetry, and if he considered the exercise of it mere as light recreation, the contemporary criticisms of George Puttenham (q.v.) declare 'for ditty and amorous ode, Sir Walter Raleigh's vein most lofty, insolent and passionate.' His poems are, however, largely of a philosophic cast. The authenticity of some of the poems attributed to him has been questioned. One of the finest is that beginning 'Go, Soul, the Body's Guest'; another is the poem known as *His Pilgrimage*, and 'If all the World and Love were Young' is widely known. No collection of his poems was made in his lifetime or shortly after his death, the first collection being that of Sir Egerton Brydges (1813). It may be mentioned that Spenser committed the first three books of his *Faerie Queene* to the press under the encouragement of R. Among his other prose works are *A Report of the Truth of the Fight about the Isles of the Azores* and his *Journal* of his second voyage to Guiana, printed from the original Cotton MSS. in the Brit. Museum. See lives by W. Oldys and T. Birch (see above), and by P. Fraser Tytler, 1833; W. Stebbing, 1892; M. A. S. Huene, 1898; R. Rodd, 1901; M. Waldmann, 1928 (new ed. 1943); E. Thompson, 1935. See also H. L. Stephen (ed.), *State Trials*, 1899; C. H. Firth, *Sir Walter Raleigh's History of the World*, 1919; V. T. Harlow, *Sir Walter Raleigh's Last Voyage*, 1932; I. Anthony, *Raleigh and his World*, 1934; and D. B. Quinn, *Raleigh and the British Empire*, 1949.

Raleigh, Sir Walter Alexander (1861-1922). Eng. scholar, b. in London, son of Dr. Alexander R., Scottish Congregational minister. Educated at Univ. College, London, and King's College, Cambridge, he was prof. of modern literature at Univ. College, Liverpool, of Eng. literature at Glasgow, 1890-1904, and Merton prof. of Eng. literature at Oxford from 1901. Amongst his writings are *The English Novel* (1891); *Robert Louis Stevenson* (1895); *Milton* (1900); *Wordsworth* (1903); 'The English Voyages of the Sixteenth Century' (in Hakluyt's *Voyages* vol. xii., 1905); *Shakespeare* (1907); *Romance* (1910); *England and the War* (1918); and vol. 1. of *History of the War in the Air* (1922). Knighted in 1911. See life by V. Crum, 1923; also H. W. Garrod, *The Profession of Poetry*, 1929, and D. MacCarthy, *Portraits*, 1931.

Raleigh, cap. of N. Carolina, U.S.A., and also of Wake co. It is a well-built town and has iron foundries, cotton underwear, and hosiery mills, railroad shops, overall factories, office and school furniture factories, fertiliser factories, and an important tobacco market. R. has the state college of agriculture and engineering, Meredith Baptist College, Shaw Univ., and other educational institutions. Pop. 46,900.

Rallentando (It. slowing down), musical

term for a gradual reduction in the speed of the music. The same instruction is also expressed by *ritenuto* (holding back) or *ritardando* (retarding).

Rallidæ, see RAIL.

Ram, see HYDRAULIC MACHINERY and PUMPS.

Ram, The, see ARIES.

Rāma, in Hindu mythology, the hero of the great Sanskrit epic, the *Rāmāyana* (q.v.), the Rāma-Chandra, or seventh incarnation of Vishnu. See *Rāmāyana*.

Rāmādan, ninth month of the Muslim year. It was in this month that Mohammed received the revelation of the Koran, and hence it is of peculiar sanctity. During R. strict abstinence from food, drink, perfume, smoking, etc., must be observed from sunrise to sunset, and the extra devotional practices include a complete reading of the Koran. Those whom such a strict fast might injure are exempt from it. The rules are given in the Koran.

Ramadie, tn. of Iraq, 59 m. N.W. of Bagdad, on the Euphrates. Turkish forces surrendered here, on Sept. 29, 1917, to Brit. troops under Gen. Maude.

Ramah, name of sev. places in Palestine, of which two (which may be identical) are important: (1) City of Benjamin, the traditional site of Rachel's tomb. (2) Bp. of Saul.

Raman Effect. When monochromatic light passes through a transparent medium the emergent beam consists of a mixture of light of the same wave-length as the incident beam, together with a small amount of scattered light of longer wave-length. This fact was first discovered in 1923 by the Indian physicist, Sir C. V. Raman, and is known as the R. E. It is not to be confused with the familiar phenomenon of fluorescence (q.v.), in which the wave-length of the emergent beam depends only on the nature of the fluorescent substance, not on the wave-length of the incident beam. In the R. E. the change of wave-length produced by the scattering of the light varies with the wave-length of the incident light. The effect is explained by the quantum theory (q.v.) of light as being due to a loss of energy of the light-quant of the incident light. The lost energy reappears as molecular energy of the scattering medium. The R. E. may be compared and contrasted with the Compton Effect (q.v.), where the scattering of hard X-rays by media of light atomic weight results in an increase of the wave-length of the emergent beam, but the loss of energy of the light-quant reappears as the kinetic energy of an electron knocked out of an atom of the scattering substance.

Ramanuja (d. c. 1137), Brahmin, founder of the Vaishnava sect, b. at Perambur, near Madras. He was buried in the great temple of Shrirangnath. He maintained the personal existence of a supreme deity.

Rāmāyana, one of the two great Sanskrit epics of anct. India, the other being the *Mahābhārata* (q.v.). The R. is believed to be the older of the two, and is the shorter; it differs from the *Mahābhārata* in that it is apparently the work of a single

mind, and not a compilation. It is attributed to Vālmiki, who seems, at any rate, to have been a real personage. The date of composition of R. is uncertain: the geographical, political, and social outlook of the poem suggest the fifth century B.C., but the general regularity of language and metre, and other facts, make it seem probable that the great poet who gave to R. its present form belonged to the second century B.C. A complete ed. of the older text was pub. at Madras in 1856, trans. into Eng. verse (1870-75) by R. T. H. Griffith and R. Duft in Everyman's Library and Temple Classics. The poem is held to typify the expansion of Hindu influence over the S. of India, although it seems a product of E. Hindustan. It celebrates the deeds of a certain king and his four sons and contains 48,000 verses. The central figure is Rāma-Chandra, a prince of the kingdom of Ayodhyā (Oudh). He wanders over the S. parts of India, and his wife Sītā is captured by Rāvana, a giant who rules over Ceylon. With the aid of Vibhishana, a brother of Rāvana, and Sugriva, king of the monkeys, Rāma conquers Ceylon, and recovers his wife Sītā. Finally he is restored to the throne of his ancestors in Ayodhyā. There are sev. Rāmas in Sanskrit literature; Chandra, the surname of the hero of the R., signifies the moon. See also SANSKRIT LANGUAGE AND LITERATURE.

Rambouillet, Catherine de Vivonne, Marquise de (1588-1665), b. at Rome, her father being Fr. ambas. there. In 1600 she married Charles d'Angennes, who became marquis of R. in 1611. About 1615 she started her famous *salon* at the Hôtel de R., to which all the greatest and most brilliant men in Paris flocked, and where were found also her successors in the literary *salon*, Mlle de Scudéry and Mme de Sévigné. Her influence was all for the refinement which degenerated in her successors into *préciosité*.

Rambouillet, tn. of France in the dept. of Seine-et-Oise, 20 m. S.W. of Versailles. There is a picturesque, anct., and formerly royal château, with beautiful parks. In 1830 Charles X. here signed his abdication. Pop. 7000.

Ramée, Louise De La, see OUIDA.

Ramés, Pierre de la, see RAMUS.

Rameses, name of sev. kings of anct. Egypt. **Rameses I.**, the founder of the nineteenth dynasty, lived about 1370 B.C.; he reigned only two years, and those were spent in severe fighting. **Rameses II.** (*Osymandias*), one of the most famous of Egyptian kings, the third of the nineteenth dynasty, was the son of Seti I. He reigned sixty-seven years, and during that time followed up the work begun by Seti I., and erected many monuments, his greatest achievements in architecture being the excavation of the rock temple of Abu-Simbel and the completion of the great hall of Karnak. He also enlarged and adorned the temple of Tanis, which contained a colossal figure (92 ft. high) of himself standing erect and crowned, sculptured in red granite. He was, too, a most successful warrior, his most notable campaign being against the Hittites. The great

battle of Kadesh, in which the issue was decided by his own personal courage, is celebrated in the epic poem of Pentaur. His oppressive rule, however, left Egypt impoverished and suffering from an incurable decline. *Ramees III.* (1225 a.c.), founder of the twentieth dynasty, was famous for his great victory over the confederation of people from Crete, Cyprus, Philistia, and the N. Mediteranean, who combined with the Libyans and attacked Egypt by land and sea. R. won the great naval battle near Pelusium, and also defeated the land force. His trading fleets were extremely successful, and considerably increased the commerce of Egypt. Nine other kings of the name of R. followed Ramees III.; they were not great men as far as we know, and the last of the name, Ramees XII. was entirely under the control of the priests. His son, Prince R., was probably murdered by the high priest, Ier-Hor, who seized the throne. *See EGYPT, History*

Ramganga, Western, riv. of India and a trib. of the Ganges. It rises in 30° 6' N. and 70° 20' E., and flows S.E. for 360 m., joining the Ganges, near Cawnpore.

Ramie, or China Grass, *see BOEHMIA*.
Ramillies, vil. of N. Brabant, Belgium, 29 m. S.E. of Brussels. It was the scene of Marlborough's great victory in 1706. Pop. 640.

Ramleh ('the Sandy'), vil. of Palestine, 10½ m. S.E. of Joppa. Founded in the eighth century by the Ommayyads, it was taken by the crusaders in 1187, and became the headquarters of Richard Cœur de Lion. Its famous tower (the 'Tower of the forty Martyrs') is of Muslim origin, and dates from the fourteenth century. This tower was the minaret of a large mosque originally built by Khalif Suleiman, the founder of the tn. Pop. 15,200.

Ram Mohun Roy, Raja, sometimes **Rammohun Roy**, *see* BRAHMA, SAMAJ.

Ramnad, dist. and tn. of India, in the United Provs. The tn. has the palace of the raja of R. Area of dist. 4851 sq. m. Pop. 1,980,000; of tn. 21,400.

Ramnagar: 1. Tn. of India, in the United Provs., on the Ganges, 2 m. from Benares. Pop. 12,000. 2. Tn. of the W. Punjab, Pakistan, 63 m. N.W. of Lahore. Pop. 7000.

Ramón Y Cajal, Santiago (1852-1934), Sp. histologist and neurologist, b. at Petilla de Aragón. He was prof. of histology and pathological anatomy at the univ. of Madrid. R. y C. worked on the origin and termination of the olfactory nerve fibres, on the human cerebral cortex, on the structure of the sensory ganglia in man and animals, on the retina of the eye, and on the regeneration of nerves. His treatise in 3 vols., *Histología del Sistema Nervioso del Hombre y de los Vertebrados* (Histology of the Nervous System, in Man and Vertebrates), was pub. from 1897 to 1904. In 1906 he shared (with C. Golgi) the Nobel prize for medicine in virtue of his work on the histology of the nervous system. The horizontal cells of C. in the cerebral cortex, the olfactory area of P., the nucleus of C. (commissural nucleus), and

various staining methods are named after him.

Ramoth-Gilead (modern Reimun), vil. of Palestine, mentioned in the Bible as a tn. of Gad. It was a city of refuge.

Rampant, *see* under HERALDRY.
Rampart, *see* BASTION; FORTIFICATION,
Ramphastides, *see* TOUCANS.

Rampion, or *Campanula rapunculus*, biennial plant (family Campanulaceae), with long white radish-like roots which with the leaves were formerly and still are occasionally grown and used as a winter salad. The plant is a native of Britain, and bears small, pale blue flowers. Two other Rts. which occur in Britain are members of the genus *Phytuma*, of the same order.

Rampur, state of the United Provs. India, with an area of 892 sq. m., and watered by the Kosia and Nahul. The chief crops are maize, rice, and sugar-cane, and jewellery and pottery are made at the cap. R. Pop. state 477,000, tn. 89,300



ALLAN RAMSAY, THE POET

Ramsay, Allan (1686-1758), Scottish poet, b. at Leadhills, Lanarkshire, settled in Edinburgh as a wig-maker, and soon had a business from which he derived a comfortable living. In the year he married (1712) he joined the Jacobite 'Easy Club,' to the members of which he read poetry of his own composition. He then began to print his verses on single sheets, and found that there was a demand for them. About 1716 he became a bookseller, and began to publish his own writings. *Fables and Tales* and *A Tale of Three Bonnets*, a political allegory, appeared in 1722, *The Tea-table Miscellany* in 1724-27, and the pastoral drama, *The*

Gentle Shepherd, in 1725. After 1730 R. ceased to write. He ed. sev. vols. of old Scottish poetry. He wrote much that was charming if nothing that was great, and such pieces as *Bessy Bell* and *Farewell to Lochaber* will remain known. See lives by W. H. O. Smeaton, 1896, and B. Martin, 1931; also D. T. Holmes, *Lectures on Scottish Literature*, 1904.

Ramsay, Andrew Michael (1686-1743), Scottish writer and theologian, generally known as the Chevalier R., b. at Ayr and educated at Edinburgh. He went to France and formed the acquaintance of Fénelon, archbishop of Cambrai, who converted him to Rom. Catholicism. He became tutor to the duke of Châteaui-Thierry and afterwards to the prince of Turenne; and his reputation induced the Pretender, in 1724, to invite him to Rome, and to entrust him with the education of his children. The next year he revisited Scotland, where he remained some time, employed in literary labour. On visiting England he obtained the degree of doctor of civil law at Oxford, and was admitted a member of the Royal Society of London. After his return to France he was appointed intendant to the prince of Turenne, and he held this situation till his death, which took place at St. Germain-en-Laye. The writings of the Chevalier R. are more remarkable for purity of style than for depth or originality of thought. As a theologian he was visionary in the extreme, and his orthodoxy, even according to the principles of the Church he had adopted, is open to suspicion. His best-known works are *The Life of F. de Sales*, *de la Motte Fénelon* (1723) and *The Travels of Cyrus* (3rd ed., 1728), an imitation of the *Télémaque* of Fénelon.

Ramsay, Charlotte, see LENNOX.

Ramsay, Sir William (1852-1916), Scottish chemist, b. in Glasgow, only son of Wm. R., C.E., and nephew of Sir Andrew Crombie R., the geologist. He attended Glasgow Academy, then Glasgow Univ. till he was eighteen, and then went to Germany, to study chem. under Bunsen at Heidelberg and under Fittig at Tübingen. Returning to Glasgow in 1872, he was assistant at 'Young' Laboratory of Technical Chem. till 1874; tutorial assistant of chem., Glasgow Univ., 1874-1880; prof. of chem. in Univ. College, Bristol, 1880; principal in 1881; prof. of chem. in Univ. College, London, 1887-1913; and later prof. emeritus. He was early occupied in research in organic chem., but turned his attention to the physical side of chem., carrying out, while in Bristol, refined experiments on evaporation and dissolution in collaboration with Sydney Young. From this he pursued investigations into the molecular surface energy of liquids. After the discovery, by Lord Rayleigh, of the minute difference in density between atmospheric nitrogen and that prepared chemically, R., who had made the same discovery by different means, joined Rayleigh in research that resulted in the discovery of argon, a markedly inactive gaseous constituent of the atmosphere. This discovery they

jointly announced to the Brit. Association at Oxford, 1894. R. then investigated the inert gas contained in certain minerals, and in one (uraninite) he found helium, already spectroscopically discovered in the sun. Xenon, krypton, and neon, similarly inactive gases and present as traces in the atmosphere, were in turn discovered. In conjunction with Soddy, Collie, Cameron, Gray, and Royds, he carried on much research into radium emanation, and discovered that helium is a product of its disintegration. He was made a fellow of the Royal Society in 1888; K.C.B., 1902; and was awarded the Nobel prize in chem. in 1904.

Works, beyond those communicated to the Royal Society, Chemical Society, etc., include *System of Inorganic Chemistry* (1891); *The Gases of the Atmosphere* (the hist. of their discovery, 1896); *Modern Chemistry, Systematic and Theoretical* (2 vols., 1901, 1907); *Essays Biographical and Chemical* (1908); *Elements and Electrons* (1912). He was engaged in chemical work in connection with the First World War when he d., his fatal illness having been accentuated by his unsparing efforts in scientific work during the war. See life by Sir W. A. Tilden, 1918.

Ramsay, Sir William Mitchell (1851-1939), Brit. archaeologist and theologian; b. at Glasgow and educated at the univs. of Aberdeen, Oxford, and Göttingen. In 1882 he was made a fellow of Exeter College, Oxford; in 1885 prof. of classical art at Oxford; and in the following year prof. of humanity at Aberdeen Univ. He travelled much in Asia Minor, and was one of the foremost authorities on the Holy Land and the early Rom. Empire. The univs. of Oxford, Glasgow, and Edinburgh conferred honorary degrees on him, and he received medals from the Royal Geographical Society, the Royal Scottish Geographical Society, etc. He accompanied Sir Charles Wilson (then lately commissioned as consul-general for Anatolia, to supervise administrative reforms under the treaty of Berlin) into Anatolia and began to set the anc. geography of Asia Minor on a new basis. He made a European reputation by his articles in scientific periodicals. Among his works are *The Historical Geography of Asia Minor* (1890) (for which he was awarded, in 1906, the Victoria medal of the Royal Geographical Society, and, in 1907, the medal of the Royal Scottish Society); *The Church in the Roman Empire* (1893); *The Cities and Bishoprics of Phrygia* (2 vols., 1895-97); *St. Paul the Traveller and the Roman Citizen* (1895); *Impressions of Turkey* (1897); *Historical Commentary on Galatians* (1899); *The Education of Christ* (1902); *Studies in the History and Art of the Eastern Province of the Roman Empire* (1906); *The Cities of St. Paul* (1907); *The Revolution in Constantinople and Turkey* (1909); *Pictures of the Apostolic Church* (1910); *The First Christian Century* (1911); *The Imperial Peace* (1913); *The Bearing of Recent Research on the Trustworthiness of the New Testament* (1914); *The Making of a University* (1915); *Chapters from the*

History of Asia Minor (1924); and *Asiatic Elements in Greek Civilisation* (1927).

Ramsbottom, urban dist. of Lancashire, England, on the Irwell, 13 m. N. of Manchester. There are a number of industries, the chief being calico printing and bleaching, cotton-spinning and weaving, and paper making. Pop. 15,400.

Ramsey: 1. Seaport and popular holiday resort of the Isle of Man, on the N.E. coast, 14 m. N.N.E. of Douglas. The R. Sulby runs through the tn. and forms a harbour. R. exports farm produce. Pop. 4000. 2. Small tn. of Huntingdonshire, England, on the edge of the Fens, 11 m. N.N.E. of Huntingdon. Successive fires have destroyed nearly all trace of its antiquity. It owes its importance to the foundation of a Benedictine abbey here in 969 by Ailwyn, ealdorman of E. Anglia. The remains of the buildings are not extensive. The thirteenth-century Lady Chapel, projecting eastwards from the site of the N. transept, is now the grammar school. It was converted into a house after the dissolution. There are the remains of a very fine fifteenth-century gatehouse, and the twelfth-century par. church was originally a guest-house or hospital attached to the monastery. Pop. 5200.

Ramsgate, parl. and municipal bor., seaside resort, and mkt. tn. of E. Kent, England, situated on the S.E. corner of the Isle of Thanet, between the N. and S. Forelands. It is 4 m. S. of Margate and about 72 m. by road from London. The tn. has attained great popularity as a watering-place, its fine, firm sands and safe bathing rendering it suitable for family parties. Although the tn. faces southwards, the air is dry and bracing, yet with considerable natural shelter from rigorous weather. The rainfall is smaller than that of the great majority of meteorological stations in England. The tower of St. George's Church serves as a landmark for ships passing through the Downs. There are sev. other churches, colleges, etc., including a Benedictine abbey and school, a synagogue, and Townley Castle, a Jewish college; also St. Lawrence College (a boys' public school), and grammar, secondary, and primary schools. The harbour is noted as a yachting centre and rendezvous for light cruising craft.

R. is anct. in its origin. A primitive settlement is said to have once existed on the slopes leading to the sea. Many traces of Rom. occupation have in recent years been found in the bor. Five centuries later, about A.D. 455, the armies of Hengist and Horsa landed at Ebbsfleet (Ebbsfleet), then a notable port. In A.D. 597 St. Augustine landed at Ebbsfleet, then on the coast line. The church of St. Lawrence, the original par. of R., built about a mile from the coast, was commenced in 1064 and named after Lawrence, who accompanied Augustine on his pilgrimage through Gaul and subsequently landed with him at Ebbsfleet. It was about this church that the first permanent settlement sprang up, and gradually extended to the sea. In the thirteenth century R. is spoken of as 'a

fairly populous and good class resort.' The popularity of R. as a fashionable watering-place grew, until in the eighteenth and nineteenth centuries the tn. was much patronised by royalty. E. Cliff Lodge was once the summer residence of George IV., and Albion House was once the residence of the duchess of Kent and later of Queen Victoria, her daughter. The Obelisk at the entrance to the E. pier of the harbour commemorates the return of George IV. from Hanover in 1821. The construction of the harbour was commenced in 1749-50 and completed in 1763 at a cost of £750,000, Smeaton being the engineer. A fishing fleet gradually came into existence, but scores of vessels were lost in the First World War, and were not replaced. Pop. (estimated) 35,000.

Ramus, Peter (Pierre de la Ramée) (1515-72). Fr. philosopher, humanist, and mathematician, b. in Picardy. His parents were extremely poor, and R. ran away to Paris, and at last entered the Collège de Navarre as a servant. When he presented himself for his degree he undertook as an exercise the task of showing that Aristotle was not infallible. This was the beginning of the anti-Aristotelian opinions by which R. gained his fame. In 1543 he pub. his new system of logic, with strictures on the logic of Aristotle. The king ordered his works to be suppressed, and forbade his teaching or writing against Aristotle on pain of corporal punishment. R. availed himself of his leisure to prepare an ed. of Euclid. In 1551 he was appointed prof. of philosophy and eloquence in the Collège de France. During the next ten years he pub. a *Gk.*, a *Lat.*, and a *Fr.* grammar, and sev. treatises on mathematics, logic, and rhetoric. R., who had embraced Protestantism, brought trouble upon himself by the zeal with which he advocated the new doctrines. He was driven from Paris sev. times, and in 1568 he went to Germany and gave lectures on mathematics at Heidelberg, where he made public profession of Protestantism. Shortly after his return to Paris he fell a victim in the massacre of St. Bartholomew. Although R. had many merits as a philosopher, he was wanting in depth and caution, and his strictures on Aristotle are by no means altogether just. He had many followers in France, England, and particularly Scotland. Andrew Melville introduced the logic of R. at Glasgow.

Rana, see *FROG*.

Rancagua, tn. of Chile, cap. of O'Higgins Prov., 160 m. S.E. from Valparaiso and 50 m. S. from Santiago. It is an agric. centre, and also serves the Tentenite mining area. There are thermal springs in the vicinity. A battle fought in the streets in 1814 is its chief title to fame. Pop. 40,000.

Rancé, Dominique Armand Jean Le Bouthillier de (1626-1700), founder of the reformed Cistercian order of La Trappe (see *TRAPPISTS*) was b. of noble parents in Paris. Through the favour of Cardinal Richelieu he became canon of Notre Dame and prior of Boulogne. He was a favourite of Cardinal Mazarin, and lived a gay

life at court, but in 1662 resigned all his preferences, and retired to the abbey of La Trappe in Normandy, where he instituted the rigid discipline which distinguishes the order. He pub. an ed. of *Anacreon* with notes (1639); *Conduite chrétienne* (1697); and other religious treatises. See H. Brémond, *L'Abbé l'empêché*, 1929, and study by A. Cherel, 1930.

Rancho, or **Range**, name given to the vast areas over which sheep and cattle are grazed in the U.S.A. It is only in the W. that ranching is carried on, Texas, Kansas, Arizona, Colorado, Montana, Idaho, Arkansas, and New Mexico being the prin. states engaged. Cattle are kept in larger quantities than sheep, and that wild and picturesque figure, the cowboy, in his fringed 'chaps', sombrero, and revolvers, mounted on a bucking bronco, has become a familiar figure to Brit. cinema audiences. The Amer. Rs. are suffering from the effects of having been overstocked, and from the encroachment of cultivated land. The N. Amer. Rs. have their parallel in the *estancia* of S. America, in Uruguay, and the Argentine, and in the sheep 'stations' of Australia.

Ranchi, dist. and tn. in Bihar Prov., India. The tn. is the hot-weather seat of the prov. gov., and is situated in the Chota Nagpur div., 100 m. S.E. of Gaya. A trade is carried on in cotton goods, and there is a technical college, a missionary centre, and an Anglican diocese. Area 7159 sq. m. Pop. of dist. 1,875,400, of tn. 54,200.

Rand, or **Randt**, usual name of the gold-mining dist., situated on the Witwatersrand ridge, extending for about 120 m. at a distance of about 30 m. S. of Pretoria, Transvaal. The ridge forms the watershed between the Orange and the Limpopo; the word 'R.' is a Dutch word meaning 'edge', often used in S. Africa to describe a low range of hills. There has been much dispute over the question of the discovery of gold on the R., and recently a committee was appointed by the Commission for the Preservation of National and Historical Monuments to inquire into the facts. Summarised, the committee's findings were that one, Peter Jacob Marais, who had been a prospector in California and Australia, was the first person to find gold near the Witwatersrand. This was on Dec. 8, 1853, in the Jukskei R. Further, that the two brothers, H. W. and F. P. T. Struben, by their extensive prospecting and mining activities on the Witwatersrand, both N. and S. of the Main Reef Group of Conglomerates, from 1884 to 1886, attracted so much attention to this area that the subsequent discovery of the main reef became inevitable. The Strubens therefore made the greatest individual contribution to the discovery of the Witwatersrand goldfields. The Main Reef Group of Conglomerates was first found on G. C. Oosthuizen's part of the farm of Langlaagte shortly before the end of March 1886. This led directly to the prospecting contract of April 12, 1886. The find, which was accidental, was made

by George Walker, probably in association with George Harrison, but there is no record of either of these men having had assays made or milling done on the conglomerate, on which they subsequently pegged contract discoverers' claims. The Strubens were among the few pioneer discoverers, perhaps the only two, who profited by their discoveries; they were the original owners of the Crown mines, which became the largest gold-mine in the world.

The dist. having been made a public goldfield in 1886, the mining camp, at what appeared to be the richest point of the reef, sprang up on the bare veld. This was the site of Johannesburg. In a few years the representatives of the great financial interests had found their way to the new city. Lionel Phillips arrived on the R. in 1889. He was followed by others of his compatriots, notably Samuel Marks and Isaac Lewis, who were pioneers of manufacturing industry in the Transvaal. In an incredibly short time the corrugated iron sheds, which had theretofore encumbered the building lots of Johannesburg, began to give place to palatial buildings of marble and stucco. In 1899 the output of the goldfields was over 4,000,000 oz., and in 1904 over 3,500,000. In the latter year Chinese labour was introduced for mining purposes under an ordinance, with restrictive conditions, but in Dec. 1905 the granting of permits for their importation was stopped. Johannesburg remains the centre of the R. dist. but 'reef tns.' which were once mere suburbs of Johannesburg, have now become flourishing, independent tns., and four of them, Germiston, Benoni, Springs, and Krugersdorp, are among the first twelve tns. of the union. Until 1932 all the unrefined gold bullion produced from the mines of the R. was sent to England, and the refining done there, but in that year the mines decided to do their own refining, and the R. gold refinery was estab., Germiston being selected as the most central site in relation to the mines for its erection. Germiston has now become the largest railway junction in the Union, as well as the busiest airport, the R. airport there being the finest in the S. hemisphere. After Johannesburg Boksburg (named after the state secretary of the Transvaal Republic) is the oldest township on the R. Its importance was due to the discovery there, in 1888, of coal, which obviated the long haul from Natal and gave the gold-mining industry all the coal for power it needed. It was here that Montague White, mining commissioner for Boksburg goldfields, in 1888 constructed a lake and planted round it 40,000 trees, a veritable oasis in an otherwise ugly mine-scarred region. But the garden tn. of the reef is Benoni, with its gardens, avenues, parks, trees, and flowers, the work of Sir George Farrar. Within a 5-m. radius of Benoni are mines that produce nearly one-half of the R.'s gold output, and contribute more than £5,000,000 to the national revenue. Brakpan, another reef tn., was but bare veld twenty-nine years ago, and was first

laid out as a township in 1912 as part of Benoni. But the town which has developed still more rapidly is Springs, 6 m. beyond Brakpan. Its hist. goes back to 1883, and Ger. settlers seem to have played a big part in its settlement. Its site was noted for prodigious supplies of water and also for coal. The above are towns of the E. R. The towns of the W. R. include Langlaagte, Florida, Roodepoort, Randfontein, and Krugersdorp. At Langlaagte may be seen the homestead formerly occupied by the Oosthuizens, on which, as indicated above, gold and subsequently the reef were first discovered. The first of the

settlement was well understood by Cecil Rhodes, and utilised to promote the opening up of the tropical land N. of Cape Colony and the Transvaal.

The ore from which the R. gold is extracted is a conglomerate known as banket. In 1947 53,712,300 tons of ore were crushed, yielding 11,197,638 oz. of gold or 3.982 dwt. per ton valued at £92,740 023. The most successful year was 1941, when 67,255,450 tons of ore were crushed, yielding 14,039,912 oz. valued at £116,978,499. Some mines go to a depth of nearly 10,000 ft. The gold mines are a rapidly wasting asset,



BENONI MAIN STREET

South Africa in Ruins

large scale exploiters was J. B. Robinson (later knighted), who purchased land to the W. of Randfontein for £26,000, which eventually was worth £18,000,000. After him came Rhodes, Beit, and Barnato. Rhodes is said to have received between £300,000 and £400,000 a year from the goldfields after they had been in existence only ten years. In the long run the gold mines have probably harmed agriculture by offering higher returns for transport driving, and attracting young men away from the land. The immediate effect, however, was to provide new markets for agric. products, and to link up the outlying districts by railway connection with the R. The mining industry has, moreover, supported a higher standard of living throughout S. Africa, whilst the accumulation of wealth has made possible the endowment of univs. The intimate connection between the mining of mineral wealth and the development of European

and they will probably cease to contribute materially towards the revenue of S. Africa after no great number of years, but in Oct. 1932 geologists using the new methods of magnetic measurement, were able to announce that they had traced the westward extension of the main reef in this new area some 40 m. beyond its previously known limit. The value of the reef in this new area was tested by the sinking of boreholes and has given good results in the Orange Free State. If results continue to be favourable the opening up of an immense new area will safeguard the mining and industrial supremacy of the R., and probably lead to a new era of S. African prosperity.

See H. Chilvers, *Out of the Crucible*, 1932; W. Macdonald, *Romance of the Golden Rand*, 1933; G. S. Preller, *The Argonauts of the Rand*, 1935; A. Macmillan, *Environ of the Golden City and Pretoria*,

1936; and F. Brett Young's novel, *The City of Gold*, 1939.

Randall, James Ryder (1839-1908), Amer. writer, b. at Baltimore. He began life as a journalist, and during the civil war in America turned his attention to composing the words for popular songs, among them being *Maryland, My Maryland*, his most famous.

Randazzo, tn. of Sicily, in the prov. of Catania, 26 m. N.N.W. of the tn. of Catania. It is situated at the N.W. base of Mt. Etna, 2474 ft. above sea level. Its old ducal palace is now a prison, and there are anct. fortifications. The tn. suffered severely in the invasion of 1943; many of its medieval houses were reduced to ruins, and the churches of S. Maria, S. Nicola, and S. Martino were all badly damaged. Pop. 13,700.

Randers, tn. of E. Jutland, Denmark, and cap. of the co. R., on the Gudon-Aa. It possesses a medieval monastery, and there are manufs. of gloves, etc., railway carriage works, and distilleries; dairy produce is exported. Pop. 30,000.

Randfontein, tn. in the Union of S. Africa, in the Transvaal, 23 m. from Johannesburg. It is one of the Witwatersrand 'gold towns'; there are some old estab. mines near the tn. and sev. new ones in the area. Pop. 32,200.

Randolph, John, of Roanoke (1773-1833), Amer. politician, b. at Cawsons, in Virginia, was descended from the Indian princess Pocahontas. He was in the National House of Representatives as a Republican, 1799-1813, in 1816, from 1819 till 1825, and again from 1827 till 1829; and in the Senate from 1825 till 1827. He was chairman of the committee of ways and means from 1801 till 1807. In 1826 he fought a duel with Henry Clay, but later they became firm friends. R. entered Congress when hardly more than a boy, and as a wit he has not often been surpassed in Congress. He was opposed to slavery, and freed his own slaves by his will. See lives by H. Adams, 1882, and W. C. Bruce, 1923.

Randolph, Thomas, first Earl of Moray (d. 1332), Scottish soldier and statesman, only son of Thomas R. of Nithsdale and Lady Isabel Bruce, sister of King Robert the Bruce. After the murder of Red Comyn, R. joined Bruce, 1306; in the same year he was made prisoner by Aymer de Valence at Methven, and his life was spared by his swearing fealty to Edward I. of England. He fought against Bruce, and in 1308 was captured by Sir James Douglas. His uncle, the Bruce, pardoned him and, in 1314, created him earl of Moray and lord of Man and Annandale. In the same year he accomplished a brilliant feat of arms, the taking by surprise of Edinburgh Castle at night with thirty followers who scaled the rock by a secret path. At Bannockburn (1314) R. commanded a part of the Scottish Army, and in 1315 he distinguished himself in the expedition to Ireland by his courage. Returning to Scotland with Sir James Douglas, he seized Berwick. He was one of the ambas. sent to conclude peace with England. On the death of Bruce in 1329

he was appointed regent and guardian of David II., and died while preparing to drive back an invasion of the Eng. barons.

Randwick, metropolitan municipality of Sydney in Cumberland co., New S. Wales, Australia. It is situated 3 m. S.E. of the city of Sydney. Pop. (1939) 85,000.

Ranelagh: 1. Building erected at Chelsea in 1742 on a plot of ground which had belonged to the earl of R. The structure resembled the Pantheon at Rome, being a wooden rotunda built to accommodate some 6000 people. During the eighteenth century it was a popular pleasure resort and place of entertainment; the tea gardens were frequently visited by Johnson, Reynolds, Goldsmith, Walpole, and other notables. From 1788 it declined rapidly, and was demolished and the gardens closed in 1804. 2. Celebrated club at Barnes, on the S. bank of the Thames, founded in 1894, which now bears the name of R. It is famous for its polo matches.

Range, see RANCH.

Rangefinders, or **Telemeters**, instruments devised for calculating the distance of an object with the minimum of trouble in measuring a base. Fig. 1 shows the principle involved. If O be the observer, P the point whose distance OP is required, a base line OA is measured, 60 to 120 yds., so that the angle PAO is a right angle; an object C is observed at right angles to OA and the angle COP measured; since this equals the angle P, the triangle PAO is known and therefore the distance OP. Another method measures OD, a shorter base of some 6 yds. at right angles to AO and observes the angle OAD, from which AO is known and OP found as before. $OP = AO \cdot \csc \angle OPA$, or in the second

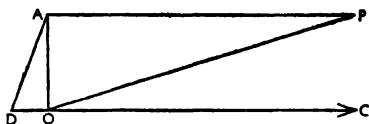


FIG. 1.
PRINCIPLE OF RANGEFINDER

case (1) $\cot \angle OAD \cdot \sec \angle POA$. The rangefinder is of great importance in the navy and army, as well as being of service in surveying, and ease and rapidity of use are obtained by constructing an instrument on the principle of the sextant for observing the angles; the readings are, by suitable mechanism and graduations, given directly in yards. In the Labbez telemeter, observations are made at either end of a base line, coincidence of image being obtained by rotating a small toothed wheel and the milled end of the instrument respectively, the distance in yards being read on the barrel opposite a mark on the milled head; a base of 20 yds. is required, the range varying from 250 to 3000 yds. The Dredge-Steward omni-telemeter is a modification of the box sextant; at zero the mirrors are at an angle of 45° , and both are adjustable;

a table of distances for a calculated base of 50 yds. is read in connection with the turning of a micrometer screw.

Fig. 2 illustrates in a simple way the principle of the Watkin rangefinder, once

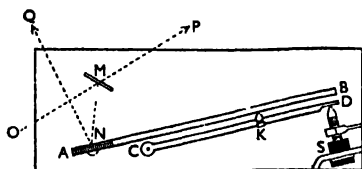


FIG. 2

PRINCIPLE OF WATKIN RANGEFINDER

used in the army. M, a fixed glass, half mirror, half transparent, allows a view of the point P whose range is required to be taken from O, the observer; the second object Q reflects from the mirror N carried firmly on the arm AB, both mirror and arm being pivoted so that Q may be aligned with P by a movement of the arm. This is obtained by turning the screw S which presses on another pivoted arm CD, thus urging the sliding collar K against A. A. C. D. is graduated so that K may be adjusted according to the length of the base line measured. The image Q being brought into coincidence with P, an index on the screw collar points out the range in yards, marked on the screw. With base (Fig. 1) AO = 60-130 yds. and OD = 6 yds., ranges up to 500 yds. may be read; with OD = 12 yds. it will read up to 800 yds., with an error not exceeding 2 per cent under conditions of well-selected bases.

The Monostatic Telemeter.—The monostatic telemeter has a very short base,

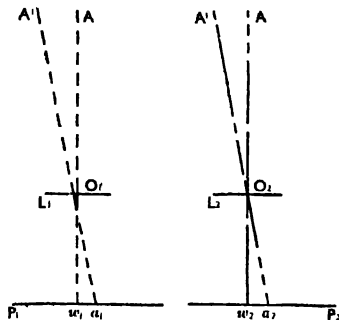


FIG. 3

PRINCIPLE OF MONOSTATIC TELEMETER

Left, Point A at infinity.

Right, Point A at a finite distance.

which is part of the instrument itself with a single screw at the observation post. This telemeter is the outcome of a series of instruments whose developments had their beginning in the bistatic telemeter

with horizontal base. The following equation will illustrate the principle: Let us suppose that there are two identical binoculars whose axes, in a horizontal plane, are parallel and at a distance b from each other. In Fig. 3 these two binoculars are represented by their objectives L_1 and L_2 , and the focal planes of these objectives by F_1 and F_2 . Let w_1 and w_2 be the points of junction of each optical axis with the corresponding plane, these points being in the focal planes. A point A at infinity in the common direction of the two axes gives in each of the binoculars an image coincident with w_1 and w_2 . If the point is in A' , to infinity, in a different direction from that of the axes, it gives two images a'_1 and a'_2 , and it is evident that $w_1a'_1$, $w_2a'_2$. In the right-hand figure a point A is given at a finite distance. Let D be the distance of this point from the vertical plane containing the two objectives. This point gives in each binocular an image a_1 and a_2 and accordingly we get the properties of like triangles:

$$\begin{aligned} b_1 &= w_1a_1 \\ D &= wf \\ b_2 &= w_2a_2 \\ D &= f \end{aligned}$$

meaning by f the common focal point of the two objectives. The monostatic telemeter is of great service to the surveyor, engineer, and explorer, for speedy measurement of distances.

Up to the Second World War it was regarded by experts as indispensable in naval and land warfare and anti-aircraft gunnery. The basic principle as generally adopted by then was the invention of Barr and Stroud. The first of their B. were for naval use and had a base of 3 ft. In the Second World War their largest naval B. had a base of 12 ft. Their land instruments comprise portable, mobile, and fixed-position types and are of various bases from 8 in. to 100 ft. The Coincidence rangefinder produces, in the field of view of a single central eyepiece, two images of an object formed by rays entering the two ends of the instrument. Such images are separated usually by a fine horizontal line. Separation may be effected: (1) by refraction through the faces of a bi-prism, intersecting at an obtuse angle in a very fine edge which is in the focus of the eyepiece or (2) by reflection, with or without the use of silvered surfaces. Coincidence of the images is obtained by means of a refracting prism of small angle, placed in the beam between the central prism combination and one of the end prisms. Movement of the refracting prism in the rangefinder tube displaces one image relatively to the other; when the prism is adjusted to give coincidence a scale moving with it indicates the range. Various forms of coincidence field of view are in use, having erect or inverted or inset strip images. The latter type is particularly useful in anti-aircraft observation, enabling the whole field to be used for following the target while the strip

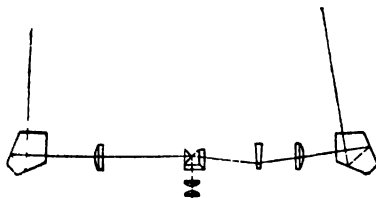


FIG. 4
ELEMENTS OF COINCIDENCE RANGE FINDER

Image is moved across the main image for the measurement. In some cases vertical base R. have been used, these having a vertical separating line in the field of view.

In Stereoscopic R. there are two eyepieces, through which the observer's eyes view the images formed respectively by the two ends of the range finder. These images are, combined in the brain to form a single image having apparent depth in space, the impression obtained being similar to that in ordinary binocular vision with the unaided eyes. In the range finder, however, stereoscopic relief is exaggerated, because of optical magnification and the difference in optical base of the range finder and of the observer's eyes. A fixed reference mark is usually provided in each field of view and the range finder so adjusted that, when the two fields are observed together, the mark appears at an infinite distance; the image of an infinitely distant object (say a star) will then appear to be at the same distance as the mark. To see a nearer object stereoscopically the eyes of the observer must converge and the image will appear stereoscopically to be nearer than the mark. By movement of a refracting prism, similar to that in Coincidence R., the object is made to appear equidistant with the mark and a scale associated with the prism indicates range. To assist the observer to a proper mental attitude for stereoscopic measurement it is usual to provide, in addition to the reference mark, a series of subsidiary marks which appear at different depths in space. Only the prin. mark, however, is used for range measurement. Some Stereoscopic R. dispense with movable parts. A series of marks, say A, B, C, etc., appears in one field, and a corresponding series, a, b, c, etc., in the other. Pairs Aa, Bb, etc., are so disposed that Aa, seen stereoscopically, appear to represent a single mark at, say 1000 yds., Bb one at 1100 yds., and so on. By observing the target image stereoscopically its position with reference to the index marks can be determined. This method is not so accurate as the moving image type, but is useful for certain purposes.

The accuracy of a range finder depends on base, magnification, and the observer's visual acuity; the error at any range is also proportional to the square of the range, e.g. at 2000 yds. is four times the error at 1000. In general the parallax

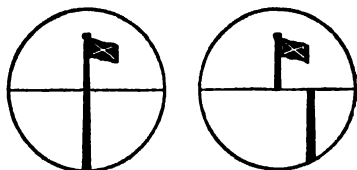
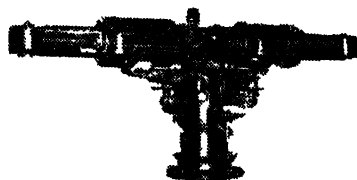


FIG. 5
TYPICAL FORMS OF FIELD OF VIEW RANGE FINDERS
Left, In coincidence. Right, Out of coincidence.

angle to which a modern large range finder has to work is $\frac{1}{2}$ second, or the angle subtended by a penny at almost 8 m. Accuracies of Stereoscopic and Coincidence R. are comparable, and, on the basis quoted, the probable error at 10,000 yds. with a range finder of 5 yds. base and magnification 28 is within $\frac{1}{2}$ per cent.

In A.A. gunnery target height is obtained automatically from slant range and angular elevation of the range finder. Sev. types of range-to-height conversion systems have been used. Optical R. are naturally limited to conditions of reasonable visibility and cannot be used in fog or through clouds, while at night they require the aid of searchlights



Larr and Stroud
12-FOOT BASE STEREOSCOPIC HIGH-ANGLE RANGE FINDER

The eyepieces are fixed in elevation as the range finder is elevated. It is mounted on a naval anti-vibration mounting.

Range finding by Radar (*q.v.*), however, has in the last ten years been developed to a high degree of accuracy, and is only dependent upon the object whose range is to be measured, reflecting sufficient of the transmitted radar pulse to operate the detecting equipment. Short pulses of radio signals of about one μ s. (micro-second) duration and repeated a thousand or more times a second are transmitted by directional aerials (*q.v.*) towards the target. Simultaneously with the transmission of a pulse a time base circuit is triggered at the receiving equipment which causes the spot on a cathode-ray tube (see VALVES) to commence its travel

across the screen, which it does at an accurately determined speed. The echo pulse reflected from the target is made to deflect the cathode-ray tube trace, and the point at which this occurs along it is a direct measure of the time taken by the pulse to travel to the target and back and, as the speed of propagation is constant (186,000 m. per sec.), the range can be determined (i.e. a pulse travels 186,000 m. per sec., equivalent to 327.30 yds. per μ s.). But it does the double journey in practice, so that the range represented by μ s. of time is approximately equivalent to 164 yds. An accuracy of 25 yds. is easily attainable up to 15,000 yds., and ranges of 100 m. or more can be determined by this method.

Ranger, formerly in England a sworn officer of the forest appointed by the king to watch the deer and prevent theft, etc. The term is now applied to a gov. official connected with public parks and forests. A robber was also sometimes called a R., as he 'ranged' for plunder, whilst the name is also given to a dog who ranges over the ground. Irregular mounted troops were also called Rs. (cf. Connaught Rs.). In the Amer. Army commando troops are called Rs. The R. is also a senior grade in the garrison movement.

Rangoon, cap. of Burma, on the l. b. of the Rangoon R., 21 m. from the sea. Within the last century it became the third seaport of importance in Brit. India. The whole trade of the delta of the Irrawaddy concentrates here. The riv. is navigable for 900 m., and for some distance from the mouth is over 1 m. in width and excellent for shipping purposes. The rice exported before the Second World War averaged 2,000,000 tons per annum; timber and petroleum are next in importance. The city is dominated by the great pile of the Shway Dagon pagoda (the religious centre of Burmese life), covered with pure gold. R. passed, with the prov. of Pegu, into Brit. hands in 1852. It possessed two cathedrals, and every kind of mosque, church, temple, pagoda, and synagogue, but a great many of these have been wholly or partly destroyed. There was a gov. college and two non-conformist colleges. The teaching univ. of R. was constituted in 1920, with two art colleges. Before the Second World War the water supply and drainage had been improved, but the general death-rate still remained rather high. R. was bombed by the Jap. on Jan. 4, 1942, their advance in Burma led to the complete civilian evacuation of the city being ordered within two days (Feb. 21-22); the city was abandoned by the Allies on March 7. Jap. forces occupied R. on March 8, 1942, but after the total defeat of Japan in Aug. 1945 the Brit. governor returned to R. on Oct. 16 and the civil administration of Burma was resumed from that date. (For details of military operations see BURMA, SECOND WORLD WAR CAMPAIGNS IN.) Approached from the air in 1946, R. seemed at first glance not to have suffered excessively, but closer inspection on foot revealed a different and hideous picture. Along the waterfront

round the main station the devastation was complete. Acres of formerly dense housing had been wiped out and were no longer even rubble. Elsewhere structure after structure, superficially perhaps almost intact, were found to be unusable shells, their insides looted and charred. Probably about 80 per cent of the tn. needed to be rebuilt. Pop. (1940) 400,000.

Rangpur, cap. of the dist. of the same name, E. Bengal, Pakistan, 240 m. N.E. of Calcutta. Tobacco, jute, and rice are produced. Area of dist. 3606 sq. m. Pop. 2,877,900; tn. 34,000.

Ranjit Singh (1780-1839), 'the Lion of the Punjab', a native Indian ruler and founder of the Sikh kingdom in the Punjab, laid the foundation of his power when he obtained Lahore from Zaman Shah in 1799. In 1809 he made a treaty with the Brit. whose power he recognised and to whom he was always faithful. His ideal was realised by 1820, when the Punjab, from the Sutlej to the Indus, was consolidated under his rule. In 1833 he obtained the Koh-i-noor diamond from Shah Shuja.

Ranjitsinhji, Kumar Shri, H.H. Maharaja Jam Sahib of Nawanagar (1872-1935), Indian prince and famous cricketer, b. at Sarodar in the prov. of Kathiawar. He was educated at Rajkumar College, Rajkot, India, and Trinity College, Cambridge. He represented his univ. at cricket, and on joining the Sussex Cricket Club in 1895 was head of the co. averages for that year and until 1902. In 1896 he was head of the batting averages for England (aggregate runs 2780, average 57), and again in 1900 (aggregate 2563, average 83). In 1897 he accompanied Stoddart's team to Australia. His batting was remarkable for its extreme grace and ease, whilst the excellence of his 'leg-slide' has never been surpassed. He had been adopted by his uncle, Jam Shri Siv Vibhaji Sahib of Nawanagar, but the adoption had been set aside in favour of a son with the sanction of the Brit. Gov. The son, however, d. in 1906, and R. succeeded to the throne. He wrote *The Jubilee of Cricket* (1897). R. served in Europe in the First World War. See life by R. Wild, 1934.

Rank, Joseph Arthur (b. 1880), Brit. financier and film magnate, b. at Hull and educated at Leys School, Cambridge. He became joint managing director of Joseph R. Ltd., the flour-milling business estab. by his father, Joseph R. (d. 1943). He is chairman of the Brit. film exhibition and production organisations of the J. Arthur R. Organisation, Odeon Theatres, Gaumont Brit. Corporation, Denham and Pinewood Studios, and Alliance Productions. Also head of the General Cinema Finance Corporation Ltd.

Ranke, Leopold von (1795-1886), Ger. historian, b. at Wiehe, Thuringia, studied at Halle and Berlin, and in 1818 became a schoolmaster at Frankfurt-on-Oder. He was prof. of hist. at Berlin during 1825-1872, and examined the archives of Vienna, Venice, Rome, and Florence during 1823-1831. He ed. the *Historische Politische*

Zeitschrift, of which he wrote a considerable part, and in 1841 was appointed historiographer of Prussia. His numerous works include *Die römischen Päpste im 16. und 17. Jahrhundert* (1834-39); *Deutsche Geschichte im Zeitalter der Reformation* (1839-47, critical ed. by P. Joachimimsen, 1925-26); *Französische Geschichte im 16. und 17. Jahrhundert* (1852-68), 1876-77; *Englische Geschichte im 16. und 17. Jahrhundert* (1859-68, 1877-1879); *Deutsche Geschichte von 1780-90* (1871-1872); *Zwölf Bücher preussischer Geschichte* (1874, 1878-79); *Weltgeschichte* (to the death of Otto the Great, continued by others to 1450, 1881-88, 5th ed. 1922). See collected works in 54 vols., 1867-90, new ed. by P. Joachimimsen, 1925 ff., selection by L. von Muralet, 1945. See also bibliography (1910) and life (1921) by H. F. Helmolt, E. Fueter, *Geschichte der neueren Historiographie* (3rd ed.), 1936; F. Meinecke, *Leopold von Ranke: Gedächtnisrede*, 1936, and *Vom geschichtlichen Sinn*, 1939; and G. P. Gooch, *Studies in German History*, 1949.

Ranken, Sir George, see ASKWITH.

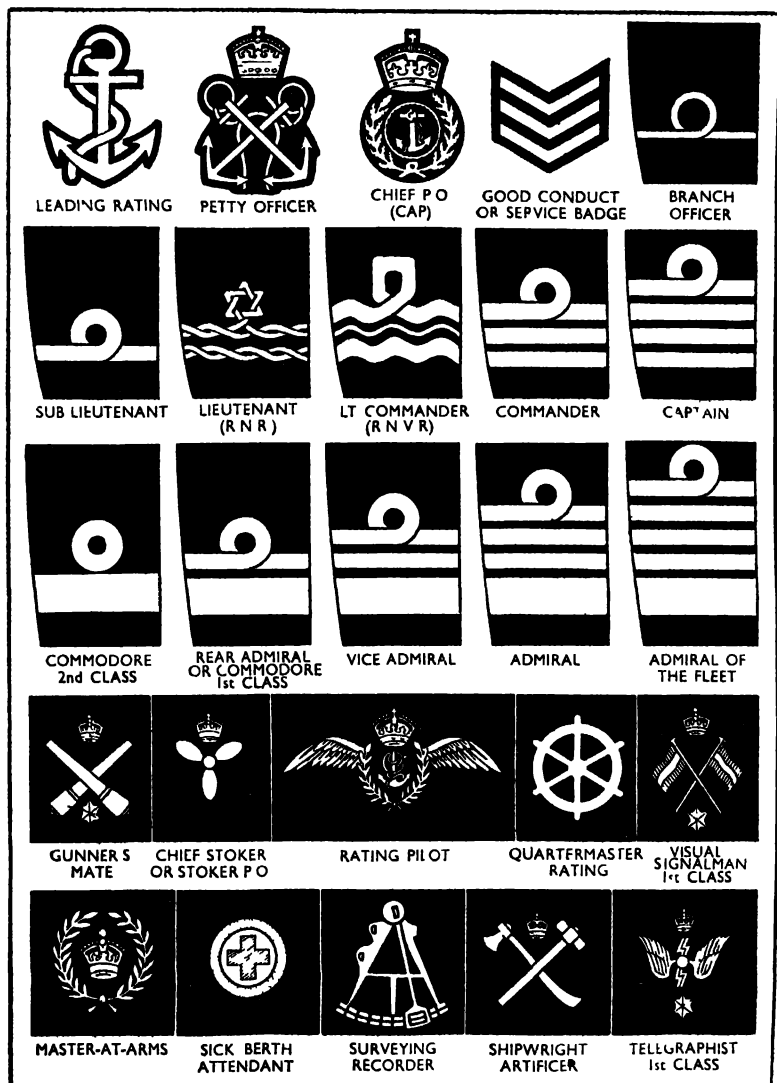
Ranlet, see RACKET.

Rankine, William John Macquorn (1820-72). Scottish engineer and physicist, b. in Edinburgh. He was elected a fellow of the Royal Society in 1853 and prof. of civil engineering at Glasgow in 1855. He may be considered one of the founders of the science of thermo-dynamics. He pub., besides other works, *Manual of Applied Mechanics* (1858); *Manual of the Steam Engine* (1859); *Manual of Civil Engineering* (1862).

Ranks. Rank is the particular station occupied by a class of persons in a society, or degrees in a hierarchy. It is generally of two kinds, 'official' and 'social'; an example of social rank is the difference between citizens and subjects in the Roman Empire. In modern times only official rank survives in Europe, notably in the armed forces of govts. Rank is here considered only in regard to male members of the R.N., army, air force, police, and fire services. R. in Queen Alexandra's Imperial Nursing Service are given under **MILITARY NURSING SERVICE**.

IN THE NAVY. Officers who enter the navy as such rise from cadet to midshipman, sub-lieutenant, lieutenant, lieutenant-commander, commander, captain, rear admiral, vice-admiral, admiral, admiral of the fleet. Time as sub-lieutenant varies from sixteen to twenty-eight months and depends on the number of first-class certificates awarded in examinations to lieutenant (see **NAVAL EDUCATION**). Thereafter promotion is automatic to lieutenant-commander after eight years' seniority as lieutenant. Promotion to commander and captain is selective for those of two to eight years' and four to eight years' seniority respectively in the previous ranks for executive officers. In other branches (engineering, supply, etc.) these zones for promotion are slightly different. All such promotions are promulgated on June 30 and Dec. 31 each year. For flag rank, officers are selected from the top five years of the

captains' list, which means, in practice, that the majority are promoted in their last and eighth year as captain. Others not promoted are compulsorily retired with pension as follows: lieutenant-commander at age of forty-five, commander at age of fifty, and captain on reaching eight years' seniority. The rank of commodore (first or second class) is a temporary rank given to senior captains when holding particular posts (e.g. commodore of barracks, chief of staff to an important commander-in-chief, etc.). A limited number of men are promoted to sub-lieutenant by selection and examination from able seaman, in which rate they must have served nine months and be under the age of twenty-three, a limit which was to be reduced to twenty-two and a half in Nov. 1950. Of the above ranks that of admiral (g.v.) is one of the oldest and appears in Eng. records in the year 1300. It was first personal to the official in supreme command of all naval forces but by 1311 became general for officers in command of fleets. At about this time, also, the rank of captain came into use, though records indicate that Edward the Confessor's prin. ship carried a rector or captain—apart from the 'bat-suen' (boatswain)—who, in those days, commanded the crew in action, acting as master, pilot, or steersman. When first introduced, the precise duties of a captain were uncertain, but they were later defined as the supreme command of a ship, although the navigation and handling was left to the master. The rank of lieutenant was introduced in 1580 with the object of providing the captain with an assistant combatant officer qualified to take his place on occasions, and also to form a body of trained sea officers from whom the captains of the R.N. might be drawn. At first there was only one lieutenant for each ship and the captain chose him from among his personal friends. Midshipman as a grade was also used at this time and men were so called because they represented that part of a ship's company who worked between the main and mizzen masts. They were not given a special uniform until 1748, although in the reign of Queen Elizabeth they formed the basis of a scheme for 'breeding officers and gentlemen who should also be seamen.' Charles II. laid down, among other qualifications for the rank of lieutenant, that three years' service, including one as a midshipman, was essential. He also ruled that no person could become a captain until he had passed for lieutenant. The rank of sub-lieutenant was originally created by Lord St. Vincent in 1802 for those deserving officers who had served their time and passed for lieutenant, but for whom there were no vacancies. Indeed many officers never rose above the rank of midshipman. The rank of commander is of comparatively recent date, and that of lieutenant-commander for a lieutenant of eight years' seniority was not estab. until the middle of the First World War. The title naval cadet was substituted for that of volunteer in 1844. Before the estab. of the rank of lieutenant



SOME BADGES AND MARKS OF RANK IN THE ROYAL NAVY

The style of interlaced and wavy bands shown for lieutenant (R.N.R.) and lieutenant commander (R.N.V.R.) are worn by all officer ranks of these reserve forces. The badges in the two lower lines are of non-substantive ranks of these only a few are shown.

the only other officers in a ship were those who had received warrants from the Admiralty or Navy Office to act as master, purser, surgeon, boatswain, gunner, carpenter, cook, etc. These warrant officers formed an advisory board to the captain and wielded considerable power, the boatswain and gunner being, next to the captain, the chief fighting officers of the ship. They were, in fact, known as the 'standing officers' of the navy. As lieutenants grew in numbers and importance, the status of warrant officers declined and, in the reign of William III., their powers and privileges were much curtailed. Later, in the late eighteenth century, the master (who corresponds with the navigating officer of to-day), the purser (corresponding to present-day supply officers), and the surgeon were absorbed into the wardroom and became commissioned, while the remainder formed the basis of the modern warrant officer grade. There is thus no analogy with the naval warrant officer in either of the other two services and, to overcome the misunderstandings that arose over their status *vis à vis* the army and R.A.F., an order was issued in March 1949 that they were to be known henceforth as 'branch' officers. These officers include the commissioned shipwright, gunner, boatswain, engineer, writer, etc., and are selected from suitable ratings between the ages of twenty-five and thirty-four who pass the necessary qualifying examinations in their particular branch. A branch officer of ten years' seniority automatically becomes a senior commissioned gunner, etc., and further promotion is by selection. Branch officers, however, can receive direct promotion to lieutenant after three years' seniority so long as they are under the age of thirty-five, but must be qualified to carry out the more general duties of that rank, as opposed to the narrow limits of their specialised branch, if they are to be selected. Ratings (other than artisans) are entered as boys or ordinary seamen (ordinary signalmen, stokers II., etc.) if over the age of eighteen. On passing the necessary tests they are rated able seaman (signalman, stoker I., etc.). Promotion to the leading, petty officer, and finally the chief petty officer rates is first by examination and recommendation. Names are then placed on depot rosters for promotion as vacancies occur. Captains of H.M. ships, however, can authorise temporary promotions under certain circumstances. They also have the power to disrate for serious offences. Artisan ratings, when qualified, automatically acquire the rate of petty officer at the age of twenty-one.

IN THE ARMY. The use of titles denoting military R. with their present meaning is comparatively modern, only captain having been used in late medieval times to denote as now the commander of a company, which was the largest permanently organised body of professional soldiers that existed up to Elizabethan times. The captain's deputy was called lieutenant, like any other deputy, and for a long time had to be

particularised as lieutenant-captain. Next below him ranked the ensign or ancient, vulgarly known as the 'rag-carrier,' which sufficiently explains his duties in action. This rank still exists in the Brigade of Guards, where it corresponds to the second lieutenant of other arms. The equivalent rank in the cavalry up to about 1812 was 'cornet,' now totally obsolete. Sergeant in its military sense also dates from the Middle Ages and originally meant one whose feudal tenure of land obliged him to follow armed the tenant-in-chief to the field. It acquired the sense of one deputed to enforce discipline. As the unit of trained soldiers became larger, the chief sergeant of a regiment was called the sergeant-major, and at the time of the Civil war this officer ranked above captain and fulfilled the duties of the modern adjutant. Then the word was taken to mean the disciplinary chief of a company, and the corresponding officer of a regiment was called simply major. The whole force at this time was administered by the sergeant-major-general, now abbreviated to major-general, under the command of the captain-general (now simply general) whose deputy was the lieutenant-general. Colonel originally meant the commander of a column (of companies), and in the seventeenth century his primary function was to recruit and pay a regiment which would be named after him (e.g. 'Kirke's Lancers'). As the colonel might at the same time be a general, actual command of the regiment or its battalions if there were more than one was exercised by the lieutenant-colonel. This is the origin of the modern custom of appointing honorary colonels of regiments.

A relic of the condottieri (mercenaries, usually Eng. or Ger., in the service of the It. city-states) is found in the title corporal, an officer of the lowest rank commanding a small body ('corpo') of men, and in the prefix lance- (from an It. word meaning veteran). Lance-corporal thus meant a senior soldier acting in the place of a corporal, and lance-sergeant a senior corporal doing duty as a sergeant. In the Household Cavalry sergeants are known as corporals of horse and warrant officers (see below) as corporals-major.

Army rank is of the following qualities: *Substantive*, which is absolute. *Brevet*, which has the security of tenure of substantive, but it does not carry the pay of the higher rank, e.g. a sub-captain with the brevet of major is paid as a captain; brevet rank is somewhat in the nature of reward for good service and appears in the new year and birthday honours list half-yearly; it is essentially a peacetime institution and usually means that an officer cannot be promoted to the rank which his seniority and proficiency deserve, because owing to restricted establishment the appointments which go with the rank do not exist. *Temporary*: This is usually granted to an officer when holding an appointment usually held by an officer whose rank is higher than his own. *Acting and Local*: These are variants of temporary, but not so permanent; they

are usually granted to meet situations where an estab. must be completed quickly and is of short duration. *Honorary* carries the privileges (generally) but not the pay of the rank. It was formerly granted to bandmasters, quartermasters, etc., while serving, but now applies only to reserve and retired officers. Officers' substantive ranks and second lieutenant, lieutenant, captain, major, lieutenant-colonel, colonel, major-general, lieutenant-general, general, field marshal—promotion to these ranks is notified in the *London Gazette*.

There are at present two grades of warrant officer, holding their rank by virtue of a warrant signed by the secretary of state: warrant officers class I and class II. For a short time up to 1941 there were also warrant officers class 3, who commanded platoons or equivalent sub-units (platoon sergeant-major or troop sergeant-major).

Non-commissioned R. are those below warrant rank and above private (or trooper, guardsman, rifleman, fusilier, marine, gunner, sapper, signaller, driver, craftsman, etc., according to arm of the service). They are corporal, sergeant, and staff-sergeant.

The King's Regulations lay down the precedence of the various R. and the table of comparative rank in other services. The pay warrant lays down the pay and pension for each rank and in many cases the conditions of promotion. Originally the military R. corresponded exactly to the appointments or functions discharged by their holders. But as military organisation became more complex the variety of appointments greatly exceeded the number of R. As an example of modern practice in the Brit. Army, the following list of the estab. of an infantry battalion shows the R. held by commanders and staff: Battalion: commanding officer, lieutenant-colonel; second-in-command, major; adjutant, captain; quartermaster, captain; medical officer, captain; regimental sergeant-major, warrant officer, class I; quartermaster sergeant, warrant officer, class II. Company: commander, major or captain; second-in-command, captain; sergeant-major, warrant officer, class II; quartermaster-sergeant (colour-sergeant), staff-sergeant. Platoon: commander, lieutenant or 2nd lieutenant; second-in-command, sergeant. Section: commander, corporal; second-in-command, lance-corporal. It will be seen from this list that though the terms regimental sergeant-major, regimental quartermaster-sergeant, company sergeant-major, staff-quartermaster-sergeant, lance-sergeant, and lance-corporal are used as titles they are not in fact R. but appointments, as is brigadier, which means a substantive colonel commanding a brigade, and not, as in so many other armies, a corporal or sergeant of some arm other than infantry; brigadier was used in this sense in the reign of Charles II. to mean a corporal of the Horse Guards. The rank of brigadier-general was abolished soon after 1918.

Promotion.—In the Brit. service pro-

motion was by purchase up to 1870, when the system of promotion by seniority and examination, tempered by selection, was introduced. Above the rank of lieutenant-colonel promotion is normally by seniority and selection. Second-lieutenants may be promoted to lieutenant after three years' commissioned service on the recommendation of their commanding officer; promotions to higher ranks may only be made when a vacancy exists in those ranks. Professional examinations adapted to the arm of the service to which the officer belongs are prescribed for each rank, and examinations are held half-yearly. Lieutenants taken prisoners of war may be promoted to captain as if they were serving in their regiments; captains taken prisoners of war may be promoted to major on release or exchange. Promotion, irrespective of establishments, may be conferred on a colonel, a major-general, or a lieutenant-general (l.) during a period of war, (u.) for distinguished service in the field, or (d.f.) for distinguished service of an exceptional nature. The promotion of non-commissioned officers is by seniority and examination up to and including sergeant and thereafter by selection tempered by seniority. Bandmasters are promoted warrant officer Class I. on appointment. Promotion by 'time' is more prevalent than among officers. The above rules are those obtaining in time of peace. Obviously promotion is much more rapid for all ranks in wartime.

IN THE R.A.F. With the formation of the Royal Flying Corps on May 13, 1912, naval and military wings were estab. and officers who were transferred to the new corps retained their existing naval or military rank. In the middle of 1914, owing to the rapid growth of the naval wing, it was necessary that a reorganisation should be effected. On July 1, 1914, the separate existence of a naval air force was officially recognised when the naval wing of the Royal Flying Corps became the Royal Naval Air Service, in which new R. were instituted as follows: wing captain (relative rank, captain R.N.); wing commander (commander); squadron commander (lieutenant-commander); flight commander (lieutenant); flight lieutenant (lieutenant); flight sub-lieutenant (sub-lieutenant); warrant officer 1st grade (commissioned warrant officer); warrant officer 2nd grade (warrant officer).

Among the many questions which had to be dealt with when the R.A.F. was formed on April 1, 1918, was that of naming the officers of the new service. A list of titles was prepared as follows: ensign, lieutenant, flight leader, squadron leader, reeve, bannoret, fourth ardlan, third ardlan, second ardlan, ardlan, air marshal. An alternative list slightly varied the ranks above squadron leader. The suggestions were wing leader, leader, flight ardlan, squadron ardlan, wing ardlan, and so on. The War Cabinet decided, however, to adopt military titles. So it was that on April 1, 1918, all those naval officers who transferred to the R.A.F. changed their naval titles for

military ones. These military titles remained until the new titles for commissioned Lt. as they exist to-day were announced in orders promulgated by the Air Council on Aug. 27, 1919, and came into use immediately.

Commissioned Ranks.—The most junior commissioned rank in the R.A.F. is that of pilot officer, whilst the most senior is that of marshal of the R.A.F., intermediate R. being flying officer, flight lieutenant, squadron leader, wing commander, group captain, air commodore, air vice-marshal, air marshal, and air chief marshal. There are now twenty different branches in the R.A.F., viz. general duties (flying) technical, equipment, secretarial, R.A.F. Regiment, aircraft control, fighter control, marine, airfield construction, medical, dental, medical quartermaster, dental quartermaster, education, provost, catering, physical fitness, legal, chaplains, and directors of music, and officer R. are the same for all these branches, although the higher R. are not attainable in some branches with small estab.

In most branches promotion to the substantive R. of flying officer and flight lieutenant is given after certain qualifying periods of satisfactory commissioned service: in a few professional branches, however, promotion is given up to the substantive rank of squadron leader on a time basis—all other substantive promotions are by selection to fill vacancies in the estab. In most of the branches officers are required to pass a promotion examination in order to qualify for promotion to the substantive R. of flight lieutenant and squadron leader. Promotions are announced in the *London Gazette* normally at half-yearly intervals.

There are three kinds of rank in the R.A.F., i.e. substantive, acting, and honorary. *Substantive rank* is related to the peacetime estab. and is not normally subject to change except by promotion. *Acting rank* is granted to an officer filling a vacancy in a rank higher than his substantive rank and is withdrawn when the officer ceases to fill such a post. *Honorary rank* carries with it no executive command but is complimentary in nature. During the Second World War there were two additional R.: *temporary rank* was granted to officers selected for promotion to fill vacancies in the rank of flight lieutenant and above in the wartime estab., while *war substantive rank* was granted to officers in the junior R. on completion of certain qualifying periods of service, or to officers after holding higher paid acting or temporary rank (or both) for certain specified minimum periods. The substantive rank which an officer holds determines the age at which he will normally retire on pension. This age of retirement varies between branches, e.g. that for officers of the general duties (flying) branch is lower rank for rank than for officers serving in the ground or professional branches. The relative R. of R.A.F. officers with those of officers in other services are laid down in King's Regulations and Air Council Instructions.

Cadets hold the rank of airman but are given the status of officer cadet whilst under training at the R.A.F. College, Cranwell (for permanent commissions in the general duties, equipment, and secretarial branches) and at the Royal Military Academy, Sandhurst (for permanent commissions in the R.A.F. Regiment). On the successful completion of training, and subject to continued medical fitness, cadets are appointed to permanent commissions in the rank of pilot officer.

Airmen (other than Aircrew).—The rank of warrant officer corresponds with the army warrant officer class I. The other non-commissioned officer R. are flight-sergeant, sergeant, and corporal, whilst the classes of airmen are leading aircrewman, aircrewman 1st class and aircrewman 2nd class, R. and classes are the same for all trades. Airmen normally enter as aircrewman 2nd class and are mustered to a specific trade after passing the necessary tests. Re-classification to aircrewman 1st class and leading aircrewman is effected after passing further tests, and in some cases completing specified periods of time. Promotion to non-commissioned officer and warrant rank is generally made to fill estab. vacancies.

Aircrew.—Prior to July 1, 1946, there were no distinctions in R. as between airmen employed on ground duties and those whose duties were performed in the air. With effect from that date, however, all airmen mustered in a flying category, whether under training or qualified, were designated 'aircrew' and given new R. as follows: cadet pilot, navigator, signaller, engineer, or gunner; pilot IV., navigator IV., etc.; pilot III., navigator III., etc.; pilot II., navigator II., etc.; pilot I., navigator I., etc.; and master pilot, master navigator, etc. These R. correspond to airmen's R. as follows: cadet pilot, etc.—A.C.II.; pilot IV., etc., and pilot III., etc.—corporal; pilot II., etc.—sergeant; pilot I., etc.—flight sergeant; and master pilot, etc.—warrant officer.

Police.—In the hors. and cos., R. in the police are constable, sergeant, inspector, superintendent, and chief constable. A chief constable may have an assistant with the rank of assistant chief constable, or an officer of lower rank, but with the title of deputy chief constable. Areas under local police authorities in the hors. and cos. are each in charge of a chief constable and are divided into divs. in charge of a superintendent, and into sub-divs. or smaller areas in charge of an inspector or, possibly, a sergeant. In tns. where the beat system is in use a sergeant has charge of a section of eight or ten men; his general duties are to supervise their duties and hours and visit them on their beats. A sergeant may have special station duties of various kinds without charge of a section. An inspector may have charge of a number of sections and sergeants or he may have charge of a sub-divisional or smaller station, or have various full-time duties as assistant to officers of higher rank in connection with station work. A chief inspector may have

special divisional or headquarters duties, but he is usually in charge of a sub-divisional station. A superintendent is usually in charge of a divisional station, or one of the larger units of area into which co. police areas are divided. In the Metropolitan Police there are no chief constables. The R. above that of superintendent are deputy commander, dist. commander, commander, assistant commissioner, deputy commissioner, and commissioner. The Metropolitan Police area is divided into four dists., each under a dist. commander assisted by a deputy commander, and with the divs. in them, five or six in each, and twenty-two in all, under superintendents. At headquarters at Scotland Yard there are three commanders and four assistant commissioners in charge of depts., and above these are one deputy commissioner and one commissioner. The R. of the C.I.D. in all forces are detective constable, detective sergeant, detective inspector, and detective superintendent. Women police have the same R. as all others, but with the official prefix 'Woman Police' in each case. Police in Scotland have an additional rank, that of lieutenant. It originally designated special duties in connection with the keeping of records, but is now nearly equivalent to the rank of chief inspector.

FIRE SERVICES.—R. and responsibilities attached thereto in the fire services in England, Wales, and Scotland are (Scottish R. in parentheses where titles differ): chief officer (firemaster), command of a co. or bor. (burgh) brigade; assistant chief officer (no corresponding rank in Scotland); divisional officer, grade I. (assistant firemaster), in charge of a div. of a brigade; divisional officer, grade II., in charge of a div. of a brigade; divisional officer, grade III. (column officer), in charge of a div. of a brigade; assistant divisional officer (senior company officer); station officer (company officer), in charge of a station; sub-officer (section leader), deputy to station officer, or in charge of a small station; fireman, in charge of a fire appliance.

Rannoch, Loch, in N.W. Perthshire, Scotland, is 9 m. long, about 1 m. wide, and 668 ft. above sea level. Out of it flows the Tummel, a trib. of the Tay.

Ranters, see **METHODISM.**

Ranunculaceæ, family of plants, with generally much divided leaves and conspicuous flowers. The flower is of an unspecialised type. There are usually five sepals, which may be petaloid. The petals are not united; they are frequently modified into nectaries, or absent. There are many stamens and carpels. The fruit is a collection of achenes or of follicles. The family includes many wild and cultivated plants of considerable beauty. Some are poisonous, but yield valuable drugs. Among the genera are Clematis (Traveller's Joy), Anemone, Ranunculus, Caltha (Marsh Marigold), Helleborus, Aquilegia (Columbine), Delphinium (Larkspur), Aconitum (Monkshood), and Pæonia.

Ranunculus, Crowfoot, or Buttercup, large genus of ann. and perennial plants.

Among the Brit. species are *R. aquatilis*, the water crowfoot; *R. flammula*, the lesser spearwort; *R. lingua*, great spearwort, the largest and handsomest Brit. species; *R. auricomus*, goldlocks; *R. arvensis*, the meadow crowfoot; *R. repens*, the creeping buttercup; *R. bulbosus*, bulbous buttercup; and *R. ficaria*, the lesser celandine. A large number of species are grown in gardens.

Raoul, see **SUNDAY ISLAND.**

Rap, counterfeit coin which passed current in Ireland for a halfpenny in the reign of George I., before the introduction of 'Wood's halfpence,' although its intrinsic value was only half a farthing. Hence come the phrases, 'Not worth a rap,' 'Don't care a rap,' etc. Rappen is also a Swiss coin equivalent to a centime.

Rapallo, seaport and winter resort in the prov. of Genoa, Italy, 15 m. E.S.E. of Genoa. Lace and olive oil are made, and there are tunny fisheries. Pop. 13,900.

Rapallo, Treaty of. After the First World War it became necessary to equate Italy's claims to Dalmatia by the treaty of London (April 26, 1915) with the claims of the new Yugoslav state. Fiume was not allotted to Italy by the treaty of London, but was claimed by It. Nationalists. In 1920 both Great Britain and the U.S.A. attempted the task of mediation, but when Giolitti became It. Premier he prepared the way to a settlement. Negotiations between Count Sforza and M. Trumbitch, the It. and Yugoslav foreign ministers respectively, were opened at Santa Margherita de Ligure. The T. of R. was signed on Nov. 12, 1920. By its terms Fiume was to be an independent port and Zara autonomous under It. suzerainty. Italy obtained Gorz, Gradisca, Trieste, Istria, part of Carniola, and the is. of Cherso, Lussin, Ule, and Lagosta. The It. boundary was drawn from Monte Nero to Volosera on the coast. All Dalmatia except Zara went to Yugoslavia. The treaty was ratified by both countries before the end of Nov. Another T. of R. was that signed on April 18, 1922, between Germany and Russia, for the mutual renunciation of reparations and the resumption of diplomatic and economic relations. This, the only tangible result of the Genoa Conference (q.v.), was largely the work of Rathenau, the Ger. foreign minister; it was extended to the new Russian republics in Nov.

Rapanui, see **EASTER ISLAND.**

Rape, the felony of having carnal knowledge of a woman against her will, by force, fear, or fraud. The prosecution must prove penetration, even the slightest, failing which there may still be a conviction for the attempt (punishable by seven years' imprisonment under the Attempted Rape Act of 1918) or at the least for an indecent assault. The punishment for R. is penal servitude to the extent of life.

Rape, div. of the co. of Sussex, England, mentioned in Domesday Book, and still extant. There are six Rs., Arundel, Bramber, Chichester, Hastings, Lewes, and Pevensey, and they correspond to hundreds elsewhere.

Rape, Cole, or Coleseed, names given to two distinct species which are cultivated as a catch crop, and also for their seeds, from which oil is extracted, the succulent leaves and stems providing in three months from the time of sowing a large bulk of green food for sheep. The *R. varieties of Brassica campestris* resemble, except in the absence of a root, the common turnip, which is thought to be only a variety. They yield *R. of colza oil* (see COLZA), but are not grown in Britain. The other species is *R. napus*, and of this species the swede turnip is possibly a variety. The *R. varieties* of this species are numerous, and when grown for seed fall into two varieties. The winter kinds are sown in Aug. and the seeds harvested the following July. The summer variety is sown in April and harvested in Sept.

Raphael, one of the seven archangels, referred to in the Apocryphal Book of Tobias. A special concern with medical matters is attributed to him, his name signifying 'God's healer.' His emblem is a fish or a pilgrim's staff. Feast, Oct. 4.

Raphael Santi, or Raffaello Sanzio (1483-1520), one of the most celebrated It. painters of the Rom. school, b. on April 6 at Urbino, on the borders of Tuscany and Umbria, son of Giovanni Santi, a painter of some note, and his wife, Magia di Battista Ciarla. The family house still stands, and a wall painting of the Madonna and Child is thought to be a portrait of Magia with her little son. When eight years old R.'s mother d. and two years later his father. He may have begun his apprenticeship as painter with his father, and later probably continued with the painter Timoteo Viti at Urbino, and subsequently entered the school of Perugino at Perugia, where he also came under the influence of Pinturicchio. Perugino's art no doubt influenced R. at an early age. In the animated beauty and tranquil, flowing lines of Perugino's compositions, R. saw the perfection of his own artistic aspirations. R.'s 'Vision of a Knight' (in the National Gallery), 'St. Michael' and 'St. George' (in the Louvre), and 'The Three Graces' (at Chantilly) were all painted during his early days at Urbino. Under Perugino he absorbed all the best qualities of this artist's work, and it is more than probable that parts of the master's pictures are attributable to R. In the Sala del Cambio, the assembly hall of the Banker's Guild in Perugia, he probably assisted Perugino in his work (c. 1500 or somewhat later). The allegorical figure of Fortitude, and perhaps also that of Justice, seem to be by the hand of R. But he had already executed independent works, such as the signed painting of the Madonna between St. Margaret and St. Lucy, dated 1499, which is in the possession of Prof. Ros in Baden, Switzerland; and on Dec. 10, 1500, he undertook, in collaboration with Evangelista di Meleto, a pupil of his father, the execution of an altarpiece for Città di Castello. Among his early independent works, executed from 1502, were 'The Crucifixion,' 'The Coronation of the Virgin,' 'St. Sebastian,' and the 'Conestable Madonna.' In 1504 he

went to Florence, where he came under the influence of Leonardo da Vinci and Michelangelo, and for four years lived an active and stirring life, rapidly developing new powers and acquiring an enlarged field of knowledge. With an extraordinary power of assimilation, he profited from individual attributes of one great master and another, though never becoming a servile imitator of any one. He combined a mastery of workmanship with perfection of design and form, and purity of taste and colour. Some of the chief paintings of this period are 'La Madonna del Granduca' (Pitti), 'Madonna del Giardino,' 'Holy Family with the Lamb,' 'Ansidei Madonna' (National



W. F. Mansell

RAPHAEL SANTI
Self portrait.

Gallery), 'La Belle Jardinière' (Louvre), 'The Entombment of Christ,' 'St. Catherine' (National Gallery), etc. About 1508 he was invited to Rome by Pope Julius II. to assist in the decoration of the apartments in the Vatican, the whole of the fresco work being entrusted to him in 1509. The amount of work produced by him from this year till 1511 was prodigious. His first large work was 'The Dispute of the Sacrament,' and he painted an almost endless number of frescoes, easel pictures, and designs. During the last six years of his life he produced many celebrated works, including 'S. Cecilia,' the 'Madonna di S. Sisto,' 'The Spasimo,' 'The Transfiguration' (unfinished at his death), etc. His versatility of power as a painter remains almost unrivalled, and notwithstanding the shortness of his life there are more than 1400 works attributed to him. As W. E. Suida says: R., in his latest works, is 'no longer the creator of the classical composition; he is Raphael, the Prophet, who foresees new artistic

possibilities beyond his time, and points the way to the future. . . . All, Titian, Correggio, Rubens, Poussin, and Rembrandt, the neoclassicists and the Romanticists, even the Moderns, made use of Raphael's inexhaustible richness." See J. Passavant, *Rafael und sein Vater*, 1839-58; G. Morelli, *Italian Masters*, 1880; E. Muntz, *Raphael, sa vie, son œuvre*, 1881; and B. Berenson, *Central Italian Painters*, 1897; and lives by R. Duppa, 1816; W. Wanscher, 1927; Phaidon Press, 1943; and O. Fischel, 1948.

Raphia, genus of tropical palms with large pinnatisect leaves and huge fruit spikes which sometimes exceed 200 lb. in weight. *R. pedunculata* (raphia or raffia palm) yields the useful tying material employed by gardeners. *R. vinifera* (the bamboo palm) yields wine. *R. tediigera* (the Japoti palm of the Amazon) is a magnificent species.

Raphoe, par. and mrlt. tn. of Eire, in co. Donegal, 15 m. S.S.W. of Londonderry. It is the centre of the well-known 'Lagan Valley' agric. area and has many historical associations. The manu. of tweeds and other woollen materials is carried on at Convooy, a vil. 3 m. to the W. Pop. 800.

Rapier, long thin v. pointed sword, introduced in historic times into England from Spain, adapted for both cutting and thrusting, the former in a less degree. Later a light, highly tempered blade used for duelling, about 3 ft. long. The fencing sword, used only for thrusting and having no edge, is now sometimes called a R. The R. was known in the Bronze Age.

Rappahannock, riv. of Virginia, U.S.A., rising in the Blue Ridge of the Alleghany Mts. It flows 250 m. to Chesapeake Bay, S. of the Potomac mouth. This and the Rapidan were the scenes of the worst battles of the civil war.

Raratonga, see COOK ISLANDS.

Rare Earths, oxides of certain metals found in a few rare minerals occurring in Scandinavia, the Urals, Brazil, India, U.S.A., and a few other localities. The chief minerals in which the rare earths are found are gadolinite, cerite, orthite, samarskite, and monazite. The rare earth metals, their symbols, and atomic weights are: yttrium (Y, 89), lanthanum (La, 139), cerium (Ce, 140), praseodymium (Pr, 141), neodymium (Nd, 144), illinium (Il, 1), samarium (Sa, 150), europium (Eu, 152), gadolinium (Gd, 157), terbium (Tb, 159), dysprosium (Dy, 162.5), holmium (Ho, 165), erbium (Er, 167), thulium (Tm, 169), ytterbium (Yb, 173), lutecium (Lu, 175). Although the oxides of these metals occur in very small quantity in the minerals gadolinite, etc., the greater part of all the members of the group are present, and their separation, which is usually done by fractional precipitation, is a matter of considerable difficulty. The first earths to be discovered were yttria in 1799 and ceria in 1803. Since then each of these has been fractionated, and nearly every earth separated has been shown to be a mixture. For example, the original ceria was split

up into true ceria and lanthana, lanthana into lanthana and didymia, didymia into samaria and didymia, samaria into samaria and europia, and the second didymia into praseodymia and neodymia. The rare-earth metals form oxides of the composition R_2O_3 ; some form oxides of the form RO_2 ; while chlorides, nitrates, and sulphates are formed by the reaction of the oxides with the appropriate acid. All the rare-earth metals are now known. Some are important technically, but most remain mere chemical curiosities. An alloy of iron and cerium with lanthanum and other rare-earth metals is used in cigarette- and gas-lighters, since when abraded it emits showers of white-hot sparks.

Rarefaction, process of reducing the density of a gas. This is usually accomplished by means of one of the devices described under AIR-PUMP. If the gas within a receptacle is rarefied, it exerts less pressure, so that there is a tendency for the atmospheric pressure to crush the receptacle. When the air in contact with a liquid is rarefied, dissolved gases tend to be liberated, and the liquid itself tends to evaporate more readily, that is, the boiling-point becomes lowered. The effect of R. of air on human beings is to cause the internal pressure of the body fluids to become apparent, leading to a sense of fullness and throbbing in the head, and to possible effusion of blood from the nose and ears.

Rare Gases, Noble Gases, or Inert Gases, name given collectively to the chemical elements helium, neon, argon, krypton, xenon, and radon, which are gases characterised by their complete lack of chemical affinity. They form a separate group in the periodic system (q.v.), and have a valency of 0. Helium is obtained from certain minerals, and from natural gas (e.g. in the U.S.A. and Canada), and occurs in certain springs (e.g. at Bath). All the R. G. except radon occur in traces in the atmosphere, whence they are extracted. Helium and radon (q.v.) are spontaneously evolved from radium. Helium is used for filling airships, being light and non-inflammable, argon is used in gas-filled electric lamps, and neon electrical discharge tubes are used in illuminated electrical advertisement signs, and in aeroplane beacons. All the R. G. were discovered by Sir Wm. Ramsay (q.v.), though helium had previously been detected on the sun by Sir N. Lockyer.

Raratonga, see COOK ISLANDS.

Rash, superficial eruption of the skin, generally consisting of minute papules or pustules. It may be caused by external irritation, by the action of certain drugs, or by gastric and intestinal disturbances, or it may be symptomatic of a specific fever, as measles, scarlet fever, etc. A characteristic R. often appears on the chest or abdomen after the operation of tonsillotomy.

Rashi (c. 1030-1105), name of the Rabbi Solomon Yischaki, one of the greatest of the rabbinical scholars; b. at Troyes. He was the first to compose a commentary on the Talmud and the books of the O.T.

Rashin, port in Korea, China. Once an insignificant fishing vill., to-day it is a commercial and shipping centre rivaling Dairen, and linked by rail with Hsinking. There is a fine natural harbour, which promises to be the chief outlet for the exports of N. Manchuria. Its development was due to Jap. enterprise.

Rasht, see **RASHT**.

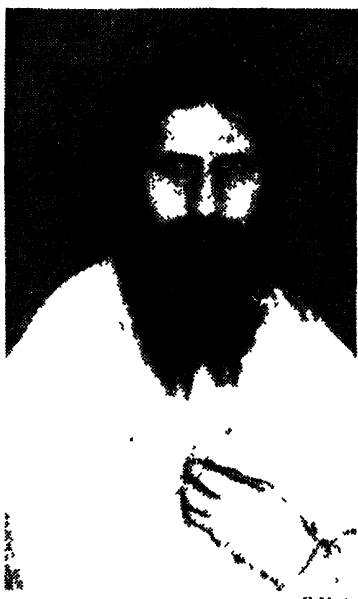
Raskolniki (Russian, schismatics), general name applied to those who dissent from the Russian orthodox church. Besides the multitudinous modern sects, there is a large body of R. who finally separated from the orthodox church in the seventeenth century. They seceded because they refused to use the service books as revised by the Archbishop Nikon, and took the name of 'old believers' or 'old ritualists.' They have since divided into two or three parties.

Rasmussen, Knud Johan Victor (1879-1933), Dan. Arctic explorer, b. at Jakobshavn, Greenland, son of a missionary, and educated at Copenhagen Univ. He visited Lapland, 1901, and accompanied the Mjølhus-Erichsen (1902-4) expedition to Cape York which studied the heathen Eskimo. R. himself made ethnographical expeditions in 1905-8, 1909, and 1910. In 1912 he crossed from Inglefield Gulf to Danmark Fjords and Independence Bay, returning in 1914 to Wolstenholme Sound. From 1921 till 1924 R. journeyed from the W. of Baffin and westward to the N.E. corner of Siberia. He describes this latter journey in *Across Arctic America* (1927). In 1931 he reconnoitred N.E. Greenland in a small motor-vessel, travelling over 2500 m., and was in Greenland again in 1933.

The benefactor and saviour of Polar Eskimos (his mother was of Eskimo descent), R. estab. an Eskimo settlement at Thule, the most northerly permanently inhabited settlement in the world (Greenland), in 1910, with the aid of the Dan. Missionary Society; he set up a code of laws for local government, and instituted social services.

Raspberry (*Rubus idaeus*), prickly shrub with pinnate leaves, white and hoary beneath, and drooping white flowers, followed by red or white fruit, which are highly valued for dessert, preserves, and other culinary uses. Its. are propagated from seed or from suckers planted in the autumn in a deep rich loam, with which manure has been liberally incorporated. The plants are generally set in rows about 5 ft. apart each way, and are trained to poles or to a trellis of wire. After the fruit has been gathered the old fruiting wood is removed to the ground, and the young canes thinned out to from five to eight per stool. The plants are surface rooters, and therefore the ground must not be dug around them, though frequent hoeing is desirable, and an ann. mulch of manure should be forked into the soil in autumn; while the fruit is being produced a liberal watering with liquid manure is desirable. Autumn-fruiting Its. are of different habit, bearing fruit on shoots of the current season's growth. Hence all shoots should be cut down in Jan.

Raspe, Rudolf Erich (1737-93), Ger. scientist, antiquarian, and writer, b. in Hanover, and educated at Göttingen Univ. Versatile and widely read, the subjects of his pub. works include volcanic geology, Leibniz as a mathematician, an introduction to Perv's *Reliques*, and a study of Ossian that became one of the pioneer works of the Gothic revival in Germany. His book entitled *Baron Munchausen's Narrative of his Marvellous Travels and Campaigns in Russia* appeared in 1785, and it is for this fantasy that he is remembered. See E. Raspe and others, *Singular Travels, Campaigns and Adventures of Baron Munchausen*, with an introduction by J. Carswell, 1918.



GRIGORY RASPUTIN

E.N. 1

Rasputin, Grigory Elimovich (c. 1870-1916), Russian monk and charlatan; b. at Pokrovskoe vill., in Siberia, son of a peasant who is said to have been named Novikh, and nicknamed 'Rasputin' or 'Ne'er-do-well-son.' Grigory had no education, but became a 'holy man,' wandering, and acquiring a reputation for licentiousness which occasioned his deserting his bp. altogether; he is believed to have gone as far as Jerusalem. Rodzianko places his introduction to the imperial court as far back as 1900, and attributes it to Bishop Feofan; Prince Yusupov places it about 1905. At any rate It's apparent success in restoring to health the heir to the Crown confirmed his position, and he supplanted Feofan as the Empress Alexander's confessor. He belonged to

the *khljety* sect, whose chief tenet was the necessity for sinning in order to obtain salvation by repentance. He and Manusevich-Manullov (private secretary to Stürmer, who was Premier in 1910) were the all-powerful opponents of popular interests. On Dec. 16-29, 1916, R. attended a supper party at the St. Petersburg home of Prince Felix Yusupov, Count Sumarokov-Klston. Here he was first half poisoned with cyanide of potassium, and then shot by his host and the deputy Purishkevich, with the assistance of the Grand Duke Dmitri Pavlovich. R.'s body, thrown into the Neva, was recovered, and buried by the empress at Tsarskoe Selo. See also under RUSSIA (HISTORY). See Prince Yusupov, *Rasputin*, 1927; his daughter's book, *The Real Rasputin*, 1929; R. Filop-Miller, *Rasputin, the Holy Devil*, 1932; and K. Noetzel, *Rasputin*, 1933.

Rassemblement du peuple français (R.P.F.), see FRANCE, *History*.

Rās Siaghah, see PISGAUL.

Ras Tafari Makonnen, see HAILÉ SELASSIÉ.

Rastenburg (Polish Ketrzyn), tn. of E. Prussia, now in Poland, 36 mi. S.S.E. of Königsberg. There are iron and copper foundries, and br. *Pop.* 16,000.

Rat, name for a number of rodents, chiefly larger members of the genus *Mus*. The Common Brown, Norway, or Hanoverian R. (*M. decumanus*) is believed to have originated in China, but is now distributed over a very large area of the world, nearly always occurring in close association with man. Almost as widely distributed is the Black R. (*M. rattus*), which also was probably a native of Asia, having gradually spread westwards till it reached Britain, where for some centuries it was the prevailing species. The Brown R. began to arrive in considerable numbers during the Hanoverian dynasty, and has gradually displaced the other species, which now would probably be quite extinct in Britain but for frequent reintroductions by ships. As the name suggests, it is a rich black in colour, though the under parts of the body shade off to a dark ash. The black colour is not alone a sufficient means of identification, as occasionally brown varieties occur, while, on the other hand, melanism in the brown R. is not unknown. The black R. has larger and more prominent ears than the other, and its tail is long and fine. The snout is longer and more pointed, the upper jaw projecting beyond the lower to a greater extent. Its general build is slighter and more graceful, and its disposition considerably less savage, and consequently it and its varieties are more commonly kept as pets. The prin. checks on Rts., which are estimated to rob industry of some millions of pounds annually, are owls, cats, poisons, and the practice of ratting. For this white bitch ferrets, strong and well-nourished, (though ravenous on the day), and rough-coated terriers with good noses, and game dispositions are essential.

Research into the problems of R. infestation was spurred by wartime needs to

preserve food and supplies, and information about the numbers and the best methods of extermination was required. The problem is a responsibility of the Ministry of Agriculture's Infestation Control Div. Occupiers of premises and land may be fined for neglecting to destroy Rts. See H. Zinsser, *Rats, Lice, and History*, 1943.

Rata (*Metrosideros robusta*), New Zealand tree which in its native habitat attains a great height, and bears red flowers. Its hard timber has many uses, in shipbuilding, and for Maori clubs and canoe-paddles.

Ratæ Coritanorum, see LEICESTER.

Ratafia, cordial flavoured with fruits, or the kernels of fruits, and used generically to include sev. fruit liqueurs. The fruits, apricots, cherries, strawberries, peaches, plums, or their kernels, are crushed and steeped in alcohol or eau-de-vie, distilled, and flavoured with sugar or various spices. Some varieties are obtained by infusing the fruits entire. See LIQUEURS.

Ratak, see MARSHALL ISLANDS.

Ratany, see RHATANY.

Ratutöskr, see under YUGOSLAVIA.

Ratcliff, par. of E. London, on the N. bank of the Thames, in Stepney. Emanuel Swedenborg (d. 1772) is buried here. *Pop.* 4,000.

Ratel, or Honey Badger (*Mellivora*), genus of carnivorous animals. The body is powerfully built, the legs are short, with long fossorial claws. The tail is short, and the ears are rudimentary. The colour is ashy grey on the upper surface and black on the under parts, an interesting contrast with the usual protective colouring. A white strip runs either side from the head to the tail, dividing the grey and black. Though closely resembling one another, two species are commonly recognised: the Indian R. or Badger (*M. indica*) occurs throughout India, feeding on a variety of small animals and also on honey; the Cape R. (*M. capensis*) is widely distributed throughout S. Africa.

Rates and Rating.—The system of rating at present in operation in England has its foundation in the Poor Relief Act of 1601 which introduced local taxation for poor relief. A liability to be rated was imposed on every inhabitant, parson, vicar, every occupier of lands or houses, etc. The office of par. overseer was created, and these officers, who administered poor relief, were the rating authority for each par. In course of time a number of rates were levied in addition to the poor rate, such as the bor. rate, general dist. rate, and highway rate, but the general principles laid down for the levying of the poor rate formed the basis upon which all these rates were levied, and these received little alteration, except in the metropolitan area, until the passing of the Rating and Valuation Act, 1925, which abolished overseers and transferred their rating functions to bor., urb., and rural dist. councils. In 1869 the rating practice was revised for London, owing to the phenomenal growth of the pop., and as a result

the par. disappeared as the unit of local government in the metropolitan area. The 1925 Act estab. a single general rate in each bor., urb., and rural dist., and abolished the par. as the unit for rating generally, but the latter still retains limited powers of rating (see LOCAL GOVERNMENT).

The enlargement of the unit of administration had as its object the attainment of uniformity, and to assist assessment areas were constituted consisting of one or more rating areas grouped on the principle of convenience of size and simplicity of administration. The Act also set up a central valuation committee for England and Wales and co. valuation committees for each administrative co. to act in an advisory capacity to rating authorities. The latter committees were charged with the duty of taking such steps as they thought fit for promoting uniformity in the principles and practice of valuation and assisting rating authorities and assessment committees in the performance of their valuation functions.

Co. councils have no power to levy rates but obtain their funds by issuing precepts (i.e. demands) upon the rating authorities in the co., requiring them to levy and pay over the proceeds of a specified rate in the £.

The new system introduced by the 1925 Act also provided for a revaluation of all property to secure a more equitable distribution of the burden of rates, since at that time the anomalies of valuation were great. Ratable values were required to be shown in a valuation list, to be revised every five years, called a 'quinquennial valuation.' The list was, however, subject to revision during the interim as new properties or new uses arose. The method of valuation introduced and still in operation is for the rating authority to prepare proposals for the amendment of the valuation list which are submitted to the assessment committee for the area, notice thereof having been given to the occupier. The functions of the assessment committee are to revise the draft lists, to hear and determine proposals and objections by ratepayers, and eventually to approve the list as amended by the committee. The committee is concerned not only with the values of property in a particular rating area but has a duty to see that all the rating areas within its jurisdiction are equally and fairly assessed under uniform principles of valuation. A person aggrieved by a decision of an assessment committee has a right of appeal to the court of quarter sessions for the co. or place where the hereditament in question is situated.

Valuation.—The principle of all valuations is to estimate the rent at which the hereditament might reasonably be expected to let from year to year if the tenant undertook to pay all usual tenants' rates and taxes and tithe-rent charge, if any, and to bear the cost of repairs and insurance and the other expenses, if any, necessary to maintain the hereditament in a state to command that rent. This is the definition of 'net ann. value' in the

Act of 1925, and it is substantially the same as that of 'net ann. value' or 'ratable value' in the Union Assessment Committees Act, 1862, and the Valuation (Metropolis) Act of 1869.

Ratability.—The Act of 1601 mentions *inhabitants* as well as *occupiers*, so that liability to poor rate fell on inhabitants, as such, in respect of their trading profits, whether they occupied property in the par. or not. This legal interpretation of the Elizabethan Act endured until 1840, when the Poor Rate Exemption Act of that year provided that ratability should depend on the occupation of ratable property in the particular rating area. Judicial interpretation of the Act of 1601 exempted any classes of property if not specifically mentioned; e.g. inasmuch as 'coal' mines were mentioned, similarly all other mines were exempted by necessary implication, and sporting rights escaped, but these anomalies were ended by the Rating Act of 1874. Under the present law the occupier of any land or building, however used, is liable to be rated in respect of that land or building; similarly the right to receive the profits from land involves liability to rates, provided the occupation of land is necessary to earning such profits. Tithes have been rated since 1901. Exemptions include property in the occupation of the Crown and used for the purposes of the central gov., e.g. police stations and co. courts, but not buildings occupied for the purposes of local government; also churches, chapels, or other premises of the Estab. Church or, if certified, of other denominations; non-provided schools (exempted under the Education Act, 1921); and premises occupied by literary or scientific, etc., societies supported by ann. voluntary contributions and certified by the registrar of friendly societies.

The Rating and Valuation (Apportionment) Act, 1928, in conjunction with the Local Government Act, 1929, introduced rate relief for industrial and freight-transport hereditaments to the extent of three-fourths of the rate burden and gave complete relief from rates to agric. land and buildings, other than farmhouses and cottages. This relief is commonly known as de-rating and it was designed to assist productive industry and agriculture, which were experiencing financial difficulties at that time. Rating authorities lost considerable ratable value as a result of this measure and were compensated to some extent by a system of exchequer grants (see LOCAL GOVERNMENT). Even though ratable liability depends upon occupation, the owners of some properties, e.g. small properties, are liable to pay the rates, but in such cases the owner recoups himself by charging the occupier a rent inclusive of rates. Rating authorities may by resolution allow discount for prompt payment of rates and in the case of smaller properties (not exceeding £13 ratable value) may where the owner pays the rates give an allowance (called a compounding allowance) to the owner of varying percentage according to whether the owner pays the rates, whether the

property is occupied or not, or only so long as occupied, or only acts as collector on behalf of the rating authority. See also COMPOUND HOUSEHOLDER.

Rates are due and payable within seven days of demand, but action for recovery is not usually taken until towards the close of the rate period. Rating authorities have power to enforce payment of rates by distress warrant obtained from the justices, and if there are insufficient goods upon which to distrain can make application to the justices for the defaulter to show cause why he should not be committed to prison. The Money Payments (Justices Procedure) Act, 1935, empowers the justices to issue a warrant for imprisonment only where on inquiry they are of the opinion that failure to pay is due to either wilful refusal or culpable neglect. Rating authorities can require tenants and lodgers to pay rent direct to the rating authority in discharge of rates owing by the landlord.

Reform of the Rating System.—Many suggestions have been made for the reform of the rating system, and schemes for the rating of site values, land values, or capital values and a local income tax have been considered, but as the present system provides a fairly stable source of revenue, little affected by fluctuations in trade, and also fixed or localised in situation, it still remains as the basis for contribution to local authority expenditure. The valuation machinery has been reformed by the Local Government Act, 1918, and since Feb. 1950 the assessment and valuation committees have ceased to exist and rating authorities have no functions in relation to the preparation and amendment of valuation lists. Valuation lists are to be prepared and amended by valuation officers of the commissioners of Inland Revenue. New valuations lists are to be made in 1952, and an attempt will be made to obtain uniformity of valuation over much wider areas than hitherto by the application of statutory provisions indicating how the ratable values of dwelling-houses are to be calculated. Valuation courts were planned to take the place of assessment committees, to consist of a smaller number of members covering larger areas on a co. and co. bor. basis. These courts were to be formed from valuation panels, with members selected by the co. councils and co. bor. councils. Appeals were to lie to the co. court and not the court of quarter sessions as formerly. These reforms were all directed to obtaining greater uniformity of valuation, especially since exchequer grants in aid of local authority expenditure were directly linked up with the question of whether or not a co. or co. bor. council had a ratable value per head of pop. below the average for the country.

Probably the reason which prompted the gov. to introduce this reform in the machinery of valuation was that there was an obvious lack of uniformity of assessments throughout the country, and assessments themselves were not a true reflection of the rental value of premises.

The First World War brought about a change in the cost of living, so that local authorities were required to provide more extensive services on assessments in the main based upon 1914 rents. This arose from the statutory control of rents immediately following upon the war, and from the valuation of new properties by means of comparison with the assessments of controlled premises and not at the new values of the post-war period. Similar circumstances arose again as a result of the Second World War. This also caused the postponement of the quinquennial valuations. Obviously the failure of ratable values to rise commensurately with the increases in the cost of living, i.e. the cost of services provided by local authorities, meant that the local authorities had to find the money in the only other way possible, namely by increasing the rate in the £.

The gross estimated rental of ratable property in England and Wales in 1927-28 (the last year for which particulars are available in the *Statistical Abstract for the United Kingdom*) was £378,284,347; the ratable value being £278,382,818 and the assessable value under the Agricultural Rates Act, 1923 (i.e. the ratable value under the Union Assessments Acts of all property minus three-quarters of the ratable value of agric. land), £258,879,292 (£267,638,769 in 1928-29). These are ann. values for purposes of a poor rate. Later figures in respect of ann. values for purposes of a general rate show: net ann. value for 1936-37, £330,800,174, and ratable value for the same year £298,529,618. The total ratable value on which rates were leviable in England and Wales in 1914-45 was £319,093,000, and in 1945-46, £319,359,000. By far the largest part of the rates apportionment comes from dwelling-houses or other hereditaments (£295,055,288 in the year ending March 31, 1944). Industrial hereditaments or premises yielded £8,893,269; freight transport, non-freight transport, etc., £2,987,747. Contributions paid by the gov. on gov. property in lieu of rates amounted in 1943-44 to £12,156,884.

The average amount of rates per £ of ratable value was 6s. 8½d. in 1913-14; in 1914-45, 12s. 8d.; in 1945-46, 14s. 8d. In Scotland the estimated average amount per £ of ratable value of the rates, exclusive of water rates, in 1942-43 was 10s. 10d. The total sum collected from ratepayers in England and Wales in 1913-1914 was £71,276,000; to-day it exceeds £220,000,000, but it is less than one-third of the total receipts of the public authorities (£734,850,000 in 1940-41) (see also under PUBLIC DEBT). The ratable value of the co. of London (1947-48) is £54,418,000 (that of the city being £6,107,000 and of Westminster £9,801,000 in 1945-46).

Rate Services.—A typical demand note for rates is endorsed with a statement showing how the rate in the £ demanded is made up. It sets out the rate in the £ which would be required to meet the net expenses of each of the prin. services, after allowing for specific gov. grants

towards the expenses of certain services (e.g. education, highways, rivs., and housing), but without allocation to particular services of the gov. grants under the Local Government Act, 1948. The gov. grants under this Act, being in aid of local gov. expenses generally, cannot be allocated to any particular service; they reduce by the amount shown on the back of the demand note for the general rate the total rate in the £ which would otherwise be demanded.

Rath: 1. Tn. of the United Provs., India, in the dist. and 43 m. S.W. of the tn. of Hamirpur. The tn. trades in cotton goods. Pop. 10,500. 2. Formerly a tn. of Rhenish Prussia, 3 m. N.N.E. of Düsseldorf, is now incorporated in that city. 3. In Ireland, a prehistoric ring-fort, a fortified farmstead. Many were still in occupation in the Dark Ages. When the earthen ring-wall is replaced by stone, the structure is known as a *cashel*.



Staatliche Landesbildstelle, Hamburg.
THE RATHAUS, HAMBURG

Rathaus, Ger. term (Dutch, *radhuys*) for the seat of tn. gov., usually trans. by the Eng. tn. hall. In fact this trans. is historically inaccurate, since in the past, the Ger. R. (like the Fr. *hôtel de ville*) occupied a far more important position than the Eng. tn. hall, though their modern functions are more similar. The medieval Ger. and Flem. merchant cities, such as Hamburg, Nuremberg, and Bruges, possessed a degree of autonomy never gained by any Eng. city, even London, in the same period. The R. became a symbol of mercantile sovereignty, and, in the Middle Ages, its size and splendour were regarded as proof of the independence and wealth of its city. Many medieval Rs. still exist. They usually conform to a general plan, being distinguished by an imposing central

tower, e.g. Bruges, Hamburg, and containing chambers for every dept. of gov. They were the seats of justice and commerce, as well as centres of administration, and contained vaults for the city archives and treasure. The R. at Hamburg belongs to the Renaissance period; there is a Gothic R. at Bruges.

Rathbone, Eleanor (1878-1946), Eng. social reformer, b. at Liverpool, daughter of Sir Wm. R., who represented Liverpool in the House of Commons from 1868 to 1896, and was one of the founders of Liverpool Univ. She was educated at Kensington High School and Somerville College, Oxford. Helped to found a dept. of social science in Liverpool Univ. and lectured there on that subject. She was the first woman member of the Liverpool city council, the first woman M.P. for Lancashire, was independent M.P. for the Combined Univs. from 1929, and at the general election was returned unopposed, being the first woman to be so honoured. She was closely associated with the movements for raising the status of women, the welfare of children and, above all, for family allowances, for which she carried on a campaign which resulted in the passing of the Family Allowances Act of 1945. It is for this that she will be chiefly remembered, but the legislation which resulted in widows' pensions and the extension of the franchise to women also owed much to her influence. During the First World War she organised the Soldiers' and Sailors' Families Association. The Eleanor Rathbone School was opened at the Magdali children's agric. institute, near Tel Aviv, Palestine, on Oct. 19, 1949. The inscription of the plaque reads 'In memory of Eleanor Rathbone, champion of justice and lover of children.' Pub.: *The Disinherited Family* (1924); *Child Marriage: The Indian Minotaur* (1934); and *The Case for Family Allowances* (1940). See Mary D. Stokes, *Eleanor Rathbone*, 1949.

Rathenau, Walther (1867-1922), Ger. statesman and writer, of Jewish descent. His father, Emil R., was one of many spies who came to England in the years before the First World War, serving as a voluntary draughtsman in an Eng. engineering firm. Returning to Germany, he organised the A.E.G. (Allgemeine Elektrizitäts-Gesellschaft), which later became a concern of world-wide importance. Emil R. was purely a business man, but Walther was more: he studied physics, chem., engineering, and philosophy, and early discovered a method of obtaining alkalis, which was commercially exploited. In 1908 he accompanied Dernburg on his famous tour of the Ger. and Brit. African colonies. In 1915 he succeeded his father as president of the A.E.G. During the First World War he presented to Falkenhayn, then war minister, an economic plan for countering the allied blockade, and was appointed economic director. After the war he was appointed minister of reconstruction. In 1920 he became foreign minister when he negotiated the Rapallo Treaty (q.v.) which all but wrecked the Genoa Conference (q.v.). He was

assassinated on June 24, 1922. His chief book, *Von kommenden Dingen* (1917; trans. into Eng. as *In Days to Come*, 1921), is a criticism of Socialism and a protest against the domination of machinery in the widest sense of the word. See G. Raphael, *Die Neue Gesellschaft*, 1919.

Rathenow, tn. in Brandenburg, Germany, 45 m. W.N.W. of Berlin, noted for manuf. of machinery and optical instruments. Pop. 28,000.

Rathlin, is. in the N. of co. Antrim, N. Ireland, 5½ m. N. of Ballycastle. Its shape is that of a crescent, and is about 1 m. wide. Here are situated the remains of Robert Bruce's castle. Pop. 300.

Rathmines, suburb of the city of Dublin, Eire. Pop. of R. and Rathgar 40,000.

Ratibor (Polish Raciborz), tn. in Silesia, Poland, formerly of Prussia, on the Oder, 40 m. S.S.E. of Oppeln. It is noted for its machines, furniture, paper, and chemicals, and has iron foundries and railway workshops. Pop. 51,700.

Ration: 1. *In the Navy*.—The victualling of the fleet was originally in the hands of contractors, who were paid a fixed daily sum for every man in the fleet. In the course of time, however, this duty was taken up by the Admiralty itself and the chief victualling depot was estab. at Deptford, where it remained until the Second World War, when severe bomb damage caused it to be largely abandoned. The prin. depot is now at Portsmouth. At the beginning of the seventeenth century the R. of the sailor were fixed, and amongst other allowances he was given a gallon of beer per diem. This remained in force until the end of the eighteenth century when grog was introduced, the allowance being half a pint, and this was still further reduced to one gill, when evening grog was replaced by tea. This constitutes the present R., which is not allowed to officers or men under twenty. Victuals, which the men were allowed but did not actually take, were called savings, and a small monetary allowance was given in place of them. To overcome the inherent monotony of the food, a new system was estab. in 1906 which introduced a standard modified R. of the basic items together with a monetary allowance. The first experiments in what is known as general messing, which displaced the standard R., were first started in the *Dreadnought* in 1907, but the system (whereby a supply officer is responsible for providing the full messing based on an authorised maximum overhead rate) did not develop fully until after 1918, when it expanded rapidly throughout the whole fleet. It is in general use to-day, but officers, if they so prefer, may be credited with a victualling allowance instead, by which sufficient money is given to them to arrange their own dietary or to obtain gov. provisions on repayment. In a few of the older and smaller ships this victualling allowance also applies to ratings. A daily issue of lemonade made from lemon powder and sugar to every person on board may be given on the requisition of the medical officer and approved by the

captain. Persons employed in the engine-room and stokehold may also receive, in addition, a ration of ormeal and sugar; those exposed to unusually severe weather an extra issue of bread, biscuit, and meat; and those on night duty are supplied with tea or cocoa. Special issues are also given to men in submarines, surveying vessels, and small ships employed in extreme climates.

2. *In the Army*.—The soldier's remuneration in most armies has always consisted of three elements: pay, R., and free quarters. If the last two are not provided, or fall short of what is to be regarded as the normal scale, this is adjusted, in theory at least, by an increase in the first. Bartering and sale of R. to civilians will always go on where civilians are underfed and soldiers are in more than usual need of cash or a change of diet. At certain times and places this has been recognised by the military authorities and the Ger. *Kommissbrot* and Fr. *pain commun* owe their name to the fact that they were bought by housewives at the barrack gate from soldiers who had just drawn their R. R. in the Brit. Army (formerly 'commons' or 'allowance') consisted for a long time of beef, bread, and beer. Small beer was called 'Act of Parliament' in the army during the Napoleonic wars, because by the ordinances then in force each man was entitled to five pints of it daily. In recent times R. scales have been of two main kinds, 'bulk rations' issued at home or in back areas abroad, the basis of which is fresh meat, bread, and vegetables; and 'preserved rations' issued on active service in forward areas where fresh meat is supplanted by canned beef and bread by biscuits.

In peacetime the basic R. are issued by the R.A.S.C. (Irish and Scottish regiments are entitled in their basic R. to extra quantities of potatoes and oats respectively in lieu of bread or flour), and a cash allowance is made for other items of diet to be bought by the president of the Regimental Institute or his deputy, the messing officer, either from the N.A.A.F.I. (g.v.) or from the local sources. Allowances for the purchase of extra foodstuffs are of great antiquity. Rom. soldiers drew 'salt money' (*salarium*, whence the modern *salary*).

Various kinds of preserved R. packed in small quantities and containing all the elements of a day's meals were introduced during the Second World War, ranging from 'assault R.' for one man for twenty-four hours issued to men landing on combined operations to 'composite rations' for the use of tank crews or small sub-units likely to be out of touch with their own supply echelon for some days.

3. *In the R.A.F.*—There is little difference in the provision and supply of R. in the R.A.F. and that of the army, from whom the system was inherited. This was no doubt partly due to the fact that one of the forerunners of the R.A.F., the Royal Flying Corps, was an integral part of the Brit. Army, and, as such, had automatically followed general army procedure. On the formation of the R.A.F.

as a separate service much of this procedure was retained, including the system of rationing, which, apart from minor differences in administrative arrangements, is followed in broad principle today. While it may be said that the War Office are the general providers of food-stuffs for the R.A.F., only a certain proportion of the daily requirements are drawn from the R.A.S.C., the remainder being obtained from the N.A.A.F.I., or from R.A.F. unit farms or gardens, where these are established. The value of the commodities is charged against a daily monetary entitlement for each man. The aim is to provide well-balanced, palatable, and varied meals built up to a standard calorific value. Problems of feeding which are peculiar to the R.A.F. include special diets for aircrew on long-distance flights, such as distant bombing raids, 'in flight' meals on the service-scheduled routes, and feeding in connection with air-sea rescue arrangements. For many of these tasks research has produced 'emergency flying Rs.', special packs of Rs. in easily portable containers. The object of these packs is to contain in as little space as possible the maximum amount of nourishment and sustenance, compressed, block, and tabloid foods being employed. Water is issued in sealed cans, and, in addition, when considered necessary, water-purifying tablets are included in the packs. Provision has to be made in emergency meals of this type for use in extremes of temp. and climate.

On civilian rationing see FOOD CONTROL, BRITISH, IN WARTIME.

Rationalisation of Industry. A phrase used by economists and others to indicate the application of the most efficient methods in production, distribution, and transport. In its various uses, it would include ample modern equipment; mass production; co-operative effort; evenness and regularity of output; scientific organisation and management; and the elimination of unnecessary and wasteful competition. Like other compendious phrases, it has been eagerly adopted by politicians, economic teachers, business magnates, and commercial organisers, who use it, however, with such widely different interpretations that there is a danger of its being rather an illustrative phrase than the definition of a precise policy. Thus, in the sphere of politics, it may be taken as a counter-phrase to the Socialist policy of nationalisation of industry, and, in consequence, an argument for the individualist or capitalistic method as opposed to state ownership. Probably it is most clearly understood and most properly applied in relation to such great public concerns as the railways, or the greater industries such as collieries and the cotton trade. Some of the larger industries that before the Second World War had fallen on evil times owed part of their decline to antiquated methods, wasteful overlapping, and the handicap of unscientific equipment and machinery. In these cases too R. of I. implies a definite economic policy. But in the majority of cases to which the

words were, in recent years, commonly applied it is doubtful whether the phrase has any such precise import. The expression is loosely used to justify commercial policies of doubtful advantage to the community. Combines to maintain prices, manipulation of shares to control markets, crushing out weak opponents by underselling, gaining special legal privileges for particular groups of traders, and other such acts commonly associated with trusts have been made to appear almost benevolent acts under the new label of R. of I. Rationalisation has probably been carried to its greatest extreme in the U.S.A., especially in the great motor-car and steel plants. It was probably one of the contributory causes of the great business depression of 1930-1931. In the first place more goods were produced than the home market could absorb and more than an impoverished world could buy. In the next place, it contributed to unemployment, in that machinery largely did the work formerly done by men. Next to the U.S.A., Germany carried rationalisation to the greatest extreme. See also PRODUCTION AND PRODUCTIVITY. See J. A. Hobson, *Rationalisation and Unemployment*, 1930.

Rationalism, primarily a philosophical movement, but its results were felt principally in theology. It is an attitude rather than a definite doctrine; it assumes the superiority of reason over sensation as a medium of cognition, asserting reason to be an independent source of knowledge and the final standard of criticism in philosophy, aesthetics, and religion alike. It is opposed to irrationalism, which rejects or ignores all the conclusions of reason, relying upon emotion and the dictates of practical convenience. Philosophic R. was first formulated by Descartes in his *Discours de la méthode* (1637); he contended that there are elementary *a priori* concepts from which the whole of knowledge can be deduced mathematically—as opposed to those schools who contend that the mind is blank until some sense-impression of an object is conveyed to it. In other words, R. claimed that true knowledge can be deduced by ratiocination rather than by such empirical processes as intuition and sense-perception. Certain compromises between the two schools were attempted; Locke, for instance, insisted on the validity of R. and empiricism alike. But no such middle course was adopted by Descartes, who started off with such ideas as are fundamentally certain, reducing them to two categories: (1) clear, i.e. intuitively and manifestly existent, and (2) distinct, i.e. having a precise absolute value and also a precise value relative to other ideas. The whole rationalistic process was accepted also by Spinoza, who constructed his *Ethics* (pub. 1677) on mathematical lines of axioms and postulates, definitions, and propositions; by Leibnitz, who advanced the idea of a logic and dialectic that should express philosophy in the same rational method that his calculus expressed truths in pure mathematics; by Wolff, who attempted

to formulate knowledge on the lines suggested by Leibniz. Kant showed the falsity of the mathematical analogy, and demonstrated that reason alone can lead only to tautology since a concept has its individual limits. Later attempts at reconciliation were made, although not ostensibly, by Hegel and Schleiermacher; and Spencer also used R. as his basis in some respects; but as a purely philosophical force it has had no great advocates since it was refuted by Kant. The theological movement of R. was most strongly in evidence in Germany during the late eighteenth and early nineteenth centuries. Sporadic outbursts of individual R. can be traced throughout the hist. of the Christian Church, but it was not until the pub. of Lord Herbert of Cherbury's *De veritate* (1824) and *De religione gentium* (1845) that a definite theological school of R. arose. In 1754 Hermann Reimarus circulated his rationalistic writings privately; twenty years later Lessing (*q.v.*) pub. them as fragments from the Wolfenbützel library, of which he was then in charge, as an assault on the Hamburg orthodox Lutherans. Johann Semler (1728-94) was the chief figure of the reaction, however; his attack was temperate, for whilst relegating the Bible to the ranks of all original symbolical writings of the same period, and urging that the true religion was an individual soul-force and not a universal dogmatic creed, he recognised the value of the Church from the sociologist's point of view as a disciplinary agent. Michaelis, Eichhorn, and Paulus followed Semler, Paulus being the exponent of the vulgarised 'rational morality' of Kant, which tended to a somewhat crude asceticism. Theological R. is opposed to supernaturalism and to rationally indefensible dogma, and refuses to accept Scripture as an infallible hist. of divine revelation. David Strauss, Renan, and Nietzsche brought vast philological knowledge to bear on the subject, with the result that not only was the O.T. rejected, but the divinity of Jesus Christ was considered as disestablished, and He was regarded as a sectarian teacher pure and simple. See W. E. H. Lecky, *History of Rationalism in Europe*, 1870; J. F. Hurst, *History of Rationalism*, 1901; C. Watts, *The Meaning of Rationalism*, 1905; and J. McCabe, *A Rationalist Encyclopedia*, 1918.

Rationing of Food, see **FOOD CONTROL, BRITISH, IN WARTIME**.

Ratisbon, or **Regensburg**, city and riv. port of Bavaria, Germany, cap. of the Lower Bavaria and Upper Palatinate Regierungsbezirk, on the r. b. of the Danube, 85 m. N.E. of Munich. The tn. has a mediæval appearance, and is rich in works of art. The chief buildings of interest are the cathedral, begun in 1275 and completed in 1534; the Rathaus, dating from the fifteenth century; the villa of the king of Bavaria; and sev. schools and seminaries. There is a univ. The prin. manufs. include porcelain, pottery, tobacco, spirits, and machinery, and the chief industries boat-building, book-binding, and printing. R. was founded

by Tiberius, and was the residence of the early dukes of Bavaria. During the Middle Ages it was one of the most flourishing cities of S. Germany, and was raised to the position of a free imperial city. It was the seat of the Ger. Diets from 1645 to 1806. It was one of the last tns. to fall to the W. allies in the closing campaign of the Second World War in Europe. Pop. 82,700.

Ratites, or **Cursorcs**, one of the two main divs. of birds which once constituted an important group, but which is now represented only by the ostrich, rhea, emu, cassowary, and apteryx. They are all flightless, and their breast-bone is keel-less or flat.

Ratlam, or **Rutlam**, cap. of the state of R., Central India, 65 m. N.W. of Indore, and trading in opium and grain. Area of state 687 sq. m. Pop. 126,100; tn. 44,000.

Ratnagiri, cap. of the dist. of R., Bombay, India, 136 m. S. of Bombay. Sardine fishing is carried on off the coast, and rice is grown. Area of dist. 4069 sq. m. Pop. 1,373,500; tn. 18,500.

Ratnapura, tn. in the is. of Ceylon, 30 m. E.S.E. of Colombo. Rubies and sapphires are found in its rivs., and these and other gems are also mined. Pop. 8500.

Ratnavali ('The Pearl Necklace'), Sanskrit drama of the seventh century ascribed to King Shri Harsha, also to Bana and to Dhavaka. The heroine is Sagarika (owner of the necklace), a princess of Ceylon. See Cappeller's ed. in O. Bohtlingk's *Sanskrit Chrestomathie*, 1815. There are trans. in Eng. by H. H. Wilson, 1835, in Ger. by Fritze.

Raton, co. seat of Colfax co., New Mexico, U.S.A., on the Atchison, Topeka, and Santa Fé railroad, 20 m. S. of Denver. Coal is found in the vicinity. Pop. 7600.

Rat-Portage, see **KENORA**.

Rattan, see **ROATAN**.

Rattan-Cane, see **CALAMUS**.

Rattany, see **RHATANY**.

Ratti, **Achille**, see **PIUS** (popes), **Pius XII**.

Rattlesnake Root, see **SENEGAL**.

Rattlesnakes, or **Pit Vipers** (Crotalidae), sub-family of viperine snakes found only in America. The R. proper have the end of the tail made up of a number of horny flat rings, which are loosely connected together, and are capable when vibrated of making a loud noise. The head is large behind, and bears a characteristic depression or deep pit on each side of the face between the eyes and the nostril. The common R. (*C. durissus*) is now restricted to the S.E. of N. America, though once widely distributed. It averages about 4 ft. in length; the body is ash colour above, with irregular cross-bars and yellow flanks and vertebral line. It is a sluggish reptile, living on rodents, and rarely attacks human beings unless molested. Other species are *C. horridus*, which is more widely distributed in the U.S.A., the large diamond R. of Florida and Mexico, and *C. terrificus*, also abundant in Central America. The venom of R. is usually

fatal, but not invariably. The wild hogs, which are their chief enemies, generally escape serious harm from bites owing to their thick layer of fat. The flesh of R. is innocuous and edible.



RATTLESNAKE

Ratzeburg: 1. Prov. of Mecklenburg-Strelitz, Germany, on the S. side of the estuary of the Trave. It was constituted a principality in 1154. Area 148 sq. m. Pop. 15,000. Cap. Schoneberg. The *Landkreis* Schoneberg approximates to the old prov. 2. Tn. in Schleswig-Holstein, Germany. 12 m. S.S.E. of Lubeck, built partly on an is. in Lake R.; it has a Romanesque cathedral (twelfth century). Pop. 5600.

Rauch, Christian Daniel (1777-1857), Ger. sculptor, one of the most noted of the nineteenth century. b. at Arolsen, Waldeck. In 1790 he was apprenticed there to the court sculptor, Valentin, and five years later became assistant to Ruhl, court sculptor at Kassel. In 1802 he exhibited his first statue, 'Sleeping Endymion and Artemis.' Soon after, he went to Rome, where he stayed for six years, his art being influenced by Thorwaldsen. His early works consist of classical and poetical statues, groups, reliefs, etc., but he excelled in portrait-busts, statues, and monuments. He was the founder of the Berlin school of sculpture. His crowning work was the colossal monument of Frederick the Great in Berlin, an equestrian statue in bronze surrounded by groups of generals and soldiers. Other works are the statue of Albrecht Durer in Nuremberg, and statues of Blücher, Luther, and Schiller. See lives by F. and K. Eggers, 1873-91; E. D. Cheney, 1893; and H. Mackowski, 1916.

Raudnitz (Ger. Raudnice), tn. of Czechoslovakia, on the Elbe, 42 m. N.W. of Prague. The prin. attraction is the castle of Prince Lobkowitz, which contains a library and an historical collection of pictures. Pop. 10,000.

Ravanastron, see under VIOLIN.

Ravel, Maurice (1875-1937), Fr. composer, b. at Ciboure, Basses-Pyrénées, one

of the chief modern composers of the young Fr. school, studied under Gabriel Fauré at the Paris Conservatoire. In 1934 he became director of the Conservatoire Américain at Fontainebleau. He was a member of the Legion of Honour, and an Hon. D.Mus. of Oxford. R. was a Fr. musician *par excellence*, an artistic descendant of Couperin and Rameau. His genius is witty, subtle, and emotionally restrained, and he combines a deep-rooted classicism of form with the boldest experiments in harmony; especially notable and delightful are his rhythmic figures. His most important works are the music for *Daphnis et Chloé* (Diaghilev's ballet, 1909); *La Valse*, the remarkable string quartet, the trio, the violin and 'cello sonata, many pianoforte works, including *Habanera*, *Jeux d'eau*, *Pavane pour une infante défunte*, *Gaspard de la nuit*, *Le Tombeau de Couperin*, and the popular orchestral work *Boléro*. After the death of Debussy in 1918 R. was regarded as the most representative of Fr. composers. But except for the ballet opera *L'Enfant et les sortilèges* (1924), and a piano concerto (1931), he abandoned the larger forms and concentrated on small-scale works notable for finish of detail. See studies by R. Manuel, 1933; M. Roland, 1945; and N. Demuth (Master Musicians), 1948.

Ravellin, see under FORTIFICATION.

Raven (*Corvus corax*), one of the largest of the passerine birds, widely distributed in the N. hemisphere, but rare in Britain on account of its persecution by farmers and gamekeepers, whom it undoubtedly robs of numbers of young birds. It is about 26 in. long, and has a wing expanse of nearly 40 in. The plumage is dense black, glossed with purple; the beak and mouth, tongue, legs, and feet are also black. The nest is built in cliffs or in the fork of a tall tree, and is a bulky structure. In it are laid four or five pale green eggs spotted with brown. The male assists in incubation. The R. is a mimic, and, though mischievous, is readily tamed, often living to a great age as a pet.

Ravenna: 1 walled city of Italy, cap. of the prov. of the same name, in Emilia, situated in a marshy plain, 37 m. S.E. of Ferrara. In ant. times it was a port on the Adriatic, but the sea having receded, it is now about 6 m. from the coast. It is the seat of an archbishopric, founded at the close of the fifth century. R. is famous for its architectural remains, having been the cap. of Italy from the beginning of the fifth to the middle of the eighth century. Its cathedral is a modern structure, though founded in the fourth century; but some of its churches and monasteries are very ant., San. Vitale dating from the fourth and Santa Agata Maggiore from early in the fifth century. In the church of the Franciscan monastery, a fifth-century foundation rebuilt in 1793, is the tomb of Dante, who d. here in exile in 1321. The mausoleum of Theodoric, king of the Goths, is to be seen outside the tn. Before the Second World War there were colleges and religious institutions, a museum, a library, municipal buildings,

and a ruined citadel. Between the tn. and the sea there is now an extensive pine forest, and the Corsini canal affords communication with the coast. The chief manufs. are silk, wine, musical instruments, falcon-ware, linen, agric. tools, glass, soap, and lace, while in the neighbourhood rice, wheat, chestnuts, wine, olive oil, and hemp are produced. R. was a Rom. naval station on the Adriatic in the time of Augustus, and it later became the abode of Honorius, who strongly fortified it. Odoacer, who led the barbarian hordes which overthrew the W. empire of Rome, assumed the title of king of Italy, and held his court here. He was succeeded by Theodoric, under whose rule R. became a flourishing city, afterwards becoming the residence of the Gk. exarchs until it was captured by the Lombards under Aistulf in 752. In the fifteenth century the Venetians held the tn., and in 1512 the Fr. Army defeated the papal and Sp. forces here, but lost their gallant leader, Gaston de Foix. R. was captured by the Eighth Army (a.v.) on Dec. 5, 1944, as the result of a brilliant outflanking move. Although the city suffered from bombing and shelling, none of the mosaics was seriously injured and the sum total of damage to monuments and monumental buildings was relatively light. Pop.: prov. 285,500, tn. 86,400. See E. Hutton, *Ravenna*, 1926. 2. tn. in Portage co., Ohio. Pop. 8500.

Ravensburg, tn. of Württemberg, Germany, situated in a valley on the Schussen, 22 m. E.N.E. of Constance. It has remains of old fortifications, etc., and there are manufs. of textiles and machinery. Pop. 32,300.

Ravenscroft, Thomas (c. 1582-c. 1635), Eng. musical composer, chorister of St. Paul's under E. Pearce (Piers). He ed. and pub. the first collections of catches printed in England—*Pammelia Musickes Miscellanie* and *Deuteromelia* (1609). *Melismata Musicali Phantasies* appeared in 1611; *The Whole Booke of Psalmes*, a collection of psalm-tunes for four voices, was produced in 1621-33. Among these, Canterbury, Bangor, and others were composed by R.

Ravi, riv. in the Punjab, forming part of the boundary between W. Punjab, Pakistan, and E. Punjab, India, which rises in the Himalayas and flows into the Chenab. Length 450 m.

Ravilious, Eric (1903-42), Eng. engraver and water-colour artist, b. in London. He was educated at Eastbourne, and taught at the Royal College of Art. He illustrated eds. of the Golden Cockerel and Nonesuch presses, and made the decorations for Everyman's Library. His engravings are characterised by a strong sense of pattern. In the Second World War he became a war artist, and lost his life while flying from Ireland in 1942.

Rawal Pindi, name of a tn., dist., and div. of the W. Punjab, Pakistan. The tn. is the largest military station of India, and, in its irrigated valley, guards the Khyber Pass route to Afghanistan and Russia. It is situated on the N. bank of

the R. Leh, 111 m. S.E. of Peshawar near the site of the anct. city of Gajipur. It was here that the Sikhs surrendered after the battle of Gujerat, 1849. It has gas and locomotive works, iron foundries, a brewery, an arsenal, etc. There are refineries for the oil from the Khaur mineral-oil field in the Punjab, and from the small field at Digboi, Assam. Pop. 181,200. The dist. is watered by the Indus and the Jhelum, and grows principally wheat, barley, maize, millet, and pulse. Area 2022 sq. m. Pop. 785,200. The div. comprises the dists. of R. P., Gujerat, Attock, Shahpur, and Jhelum. Area 21,381 sq. m. Pop. 4,701,000.

'**Rawalpindi**,' see NAVAL OPERATIONS IN SECOND WORLD WAR, *German War on Neutrals*.

Rawdon, or **Rawden**, par. and tn. of W. Riding, Yorkshire, England, 7 m. N.W. of Leeds. There is a Baptist theological college, and cloth is manufactured. Pop. 4700.

Rawlinson, Sir Henry Creswicke (1810-1895), Eng. soldier and orientalist, b. at Chadlington, Oxford. In 1827 he went to India under the E. India Company. In 1833 he was sent to reorganise the shah's troops in Persia, where he studied and transcribed the undeveloped cuneiform inscriptions. In 1844 as political agent at Bagdad he gained his valuable knowledge of the Iraqi cuneiform inscriptions. With Layard he visited Nineveh, and obtained a grant to enable him to excavate in Assyria and Babylonia. His collection of antiquities is in the Brit. Museum. His pub. works have been the foundation of our knowledge of cuneiform inscriptions and the hist. of Babylonia and Assyria, and include *A Commentary on the Cuneiform Inscriptions of Babylonia and Assyria* (1850); *Notes on the Early History of Babylonia* (1854); and with E. Norris, *The Cuneiform Inscriptions of Western Asia* (1881-84).

Rawlinson of Trent, Sir Henry Seymour Rawlinson, first Baron, and second Baronet (1864-1925), Eng. soldier. He was the elder son of the first baronet, Sir Henry Creswicke R. Educated at Eton and Sandhurst, he was commissioned in 1881, in the Royal Rifles. D.A.A.G. to Kitchener in the Sudan, 1898, he served in the S. African war. Commandant of the staff college, 1903-6, he became a major general in 1909. In 1911 he led the 7th Div. to Ypres, received command of the new Fourth Army in 1915, and organised the prin. Somme offensive of July 1916. After a period on the Versailles Council he returned to lead the reorganised Fourth Army in the last offensives. In 1919 R. carried out the evacuation of Murmansk and Archangel, and became baron. From Nov. 1920 he was commander-in-chief, India. He pub. *The Officer's Notebook* (1890). See life, from his letters and journals, ed. by Sir F. Maurice.

Rawmarsh, tn. of the W. Riding, Yorkshire, England, 24 m. from Rotherham, with coal-mines, ironworks, brickworks, steel rolling mills, and potteries. Pop. 18,500.

Raw Materials. In old text-books of political economy this term is ill-defined, its meaning being regarded as self-evident: thus in the 1899 ed. of Palgrave's *Dictionary of Political Economy* the subject is altogether omitted. Generally speaking, R. M. may be said to be the basic or essential materials of manufacturing processes, the commodities in their natural unwrought state and not yet subjected to any process of dressing or manuf.; but it is obvious that a thing which may be included among R. M. to-day may to-morrow be transferred to the category of finished products; e.g. original R. M. are classed as finished products whenever there is a marketable substitute or synthetic product. The importance of R. M. in polemics to-day arises from the realisation of the decisive part played by them in the waging of war, e.g. crude oil and certain metal alloys, while derivatively the problem of obtaining and distributing more or less limited supplies of R. M. (and food) among the starving and suffering peoples of the world after the war gradually came to be recognised as the most serious one facing the post-war planner; and even before the Second World War broke out, the so-called 'Colonial Question' focused world attention on R. M. through the implicit assumption that the 'have-not' nations were inequitably deprived of access to R. M. and that the 'haves' were monopolists of the R. M. obtained from tropical dependencies. This article will consider the question of the international control of R. M. and the influence of substitutes in the economics of R. M.

International Control of Raw Materials.—The workers' representatives and the International Labour Office, soon after the First World War, strove to move the League of Nations to compel something in the nature of an equitable distribution of R. M., because they saw that natural inequalities allowed some countries to possess mineral riches or other valuable natural resources while others were completely lacking in them. But though strenuous efforts were made by left-wing delegates to secure some kind of reform, the League's Economic and Financial Commission did not think that any scheme for international control of the distribution of R. M. could be operated without fixing prices and allocating supplies on some principle of rationing and, in their opinion, that necessarily involved international control of the whole internal life of the countries concerned. Nor again was there any criterion by which an international office or body could fix a reasonable ratio of any raw material to be allowed to any country. The Genoa Conference of 1922 (q.v.) considered the question but did no more than adopt a resolution advocating abolition of import and export restrictions of prohibitions and admitting the right of states freely to dispose of their natural resources. Various forms of international control have been applied to, or proposed for, a great variety of commodities, including

aluminium, artificial silk, butter, cinchona bark, coal, cocoa, coffee, copper, cotton, diamonds, lead, maize, mercury, nitrates, oil, olives, opium, pepper, platinum, potash, quebracho, rubber, silver, sisal, steel, sugar, sulphite pulp, sulphur, tea, tin, timber, tobacco, whale-oil, wheat and other cereals, dairy produce, wine, wool, and zinc. The prin. object of these restriction schemes, however, was not in any way to secure equitable distribution among consumer countries, but, by controlling the exportable quantity, to secure a remunerative price to the producer. The consumer was not considered and, in the matter of rubber restriction, it is not surprising that, late in the operation of the second restriction scheme since the First World War, the Rubber Regulation Committee had to agree to the appointment on its board of an Amer. representative, the U.S.A. being by far the largest consumer of rubber.

Synthetic 'Raw' Materials.—There is no doubt that the world's R. M. will increasingly be faced with the serious threat of substitutes. The extent to which new materials, developed by technical science or chemistry, are used in the factory will always afford evidence as to whether the new product is a serious competitor of original R. M. The disposition, during the early years of the Second World War, in Great Britain to scorn ersatz materials was short-sighted. To-day there is hardly a raw material in the world for which a substitute has not been found; many of them are even now an improvement on the original R.M., despite the fact that, in many cases, the manufacturing costs are very high. Great Britain undoubtedly erred in under-rating the strength of the Ger. war machine in this respect; but substitute materials are important not only in war but for the whole of the future development of economy. It is stressed by economic realists that to-day science has advanced so far that it is able to produce new and exceedingly valuable materials out of apparent rubbish, and Brit. scientific and industrial circles have taken the question of substitutes seriously. Metals have been replaced by plastics, hard glass, and aluminium alloys; plantation rubber by buna; crude oil by synthetic fuels; wool by casein and glass; cotton by staple fibre; and attempts are being made to find an artificial leather or to substitute fish-skins for real leather.

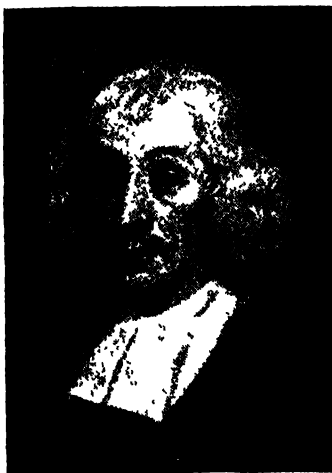
Post-war Requirements.—After the cessation of hostilities (1945) the combatant nations suffered from a serious shortage of R. M. Purchasing commissions set up during the war bought raw material stocks for the post-war period and stored these stocks in the U.S.A., whence they were released as soon as the United Nations were sure that they would be used for the work of healing and not for their destruction.

Raw Materials and the Atlantic Charter.—At the 1919 peace conference the victor powers omitted economics from their considerations altogether (apart from reparations) with the consequences which

Lord Keynes predicted in his *Economic Consequences of the Peace*. Mindful of this omission, the authors of the Atlantic Charter (q.v.) promised all nations, victors and vanquished alike, access to R. M. Yet, in fact, the charter only promised them what, with a few minor exceptions, they already had. So long as the Brit., Amer., Dutch, and other colonial powers were prepared, as they always had been prepared, to take any people's money for their colonial tea, rubber, tin, coffee, copper, nickel, etc., and charge the same prices all round, the so-called 'have-nots' had no real ground of complaint other than might spring from wounded prestige. The trouble in the past has been, not that R. M. and foodstuffs were not available, but that the peoples who needed them most had not the means to pay for them. See G. B. Shirlaw and L. E. Jones, *You and the Peace*, 1944; also F. E. Lawley, *The Growth of Collective Economy* (2 vols.), 1938; O. Dutch, *Economic Peace Aims*, 1941; and P. Lamartine Yates, *Commodity Control: a Study in Primary Products*, 1943.

Rawson, tn. of Argentina, cap. of Chubut ter. on the Chubut R., about 6 m. from the coast. It derives its name from its founder, who est. a Welsh colony near its site. Pop. 2500.

Rawtenstall, municipal bor. of Lancashire, England, 8 m. N. of Bury. It manufs. cotton and woollen goods, boots and shoes, and has ancillary trades. Pop. 26,500.



JOHN RAY

Ray, or Wray, John (1627-1705), Eng. botanist, b. at Black Notley, Essex, took his M.A. degree, and became in turn Gk. lecturer, mathematical lecturer, and junior dean of Trinity College, Cambridge. In 1662 conscientious scruples induced him

to resign his fellowship. In his earlier life he enjoyed the friendship of Willughby, the zoologist (d. 1672), whose works he ed. In his company he toured for three years (1663-66) in Europe, the scientific fruits of his travels being embodied in *Stirpium Europaeorum extra Britannias nascentium Sylloge* (1694). No small interest attaches to his *Synopsis methodica stirpium Britannicarum* (1690), his more ambitious *Historia generalis Plantarum* (3 vols., 1686-1704), and his treatise on zoology, *Synopsis methodica Animalium Quadrupedum et Serpentin Generis* (1693). The R. Society was founded in 1841. See E. Lankester, *Memorials of Ray*, 1834.

Ray, term applied to many clasp-branch fishes, of various families, distinguished by their flattened bodies and enormously expanded pectoral fins. They are closely allied to skates.

Ray, Electric, see TORREDO.

Rayahs ('cattle'), non-Muslim subjects of Turkey in Europe. They had always been very badly treated by the authorities before their emancipation in 1908.

Rayleigh, John William Strutt, third Baron (1842-1919), Brit. physicist, b. at Langford Green, Essex, eldest son of second baron. Entering Trinity College, Cambridge, as a fellow commoner in 1861 he graduated as senior wrangler and Smith's prizeman, 1865, and was a fellow of Trinity College, 1866-71. In 1871 he married Evelyn, sister of Arthur (afterwards earl of) Balfour. In 1873 he succeeded his father in the barony and was elected F.R.S. From 1879 to 1884 he was prof. of experimental physics at Cambridge, succeeding Clerk Maxwell. He presided over the Brit. Association at Montreal in 1884, and succeeded Tyndall as prof. of natural philosophy at the Royal Institute in 1887, resigning in 1905. He was secretary to the Royal Society, 1884-96, and president, 1905-8. He became a Privy Councillor in 1905. R. received the Nobel prize for physics, 1904, the Albert medal of the Society of Arts, 1905, and the Order of Merit at the coronation of King Edward VII., and was chancellor of the univ. of Cambridge from 1908. His work included research in the fundamental electrical units, Boyle's law at low pressures, optics and capillarity, the dynamical theory of gases, hydrodynamics, the mechanics of flight, photography, theory of the telephone, the distribution of alternating currents in conductors, and pure mathematics. It was when experimenting with a view to recalculation of atomic weights that he discovered a discrepancy between atmospheric nitrogen (as then extracted) and nitrogen obtained from mineral compounds, which led in turn to his discovery of argon in 1894 simultaneous with the discovery by Sir Wm. Ramsay (q.v.). In practical affairs, being a considerable landowner, he opened dairy shops in London for the sale of pure milk. He took considerable interest in psychological research. His works include *Theory of Sound* (1877-78), *Scientific Papers* (1903), and an article in the 9th

ed. of the *Ency. Brit.* on 'Wave Theory,' which is a compendious treatise on light. An obituary notice occurs in the *Proceedings of the Royal Society*, vol. xcvi. (1920-21).

Rayleigh, Robert John Strutt, fourth Baron (1875-1947), Brit. physicist, eldest son of third baron; was educated at Eton and Trinity College, Cambridge. He was elected a F.R.S. in 1905, and received the Rumford medal in 1920. He carried out important investigations in spectroscopy, but is best known for his measurements of the amounts of radioactive materials present in the earth's crust. These showed that the heat generated by radioactive changes is sufficient to account for the observed flow of heat from the interior to the surface of the earth, and that, contrary to earlier belief, no appreciable cooling of the surface is likely in the course of many millions of years. He also showed that, by measuring the extent to which the end products of radioactive changes had accumulated in rocks since they were laid down, their ages could be estimated. He wrote a life of his father (1924) and of J. J. Thompson (1942).

Raymond, or Raymund, Count of Toulouse, celebrated crusader who slew Aladin, king of Jerusalem, and planted the Christian standard on the tower of David. He figures in Scott's novel, *Count Robert of Paris*.

Raymond, Walter (1852-1931), Eng. novelist and nature writer, b. at Yeovil; entered his father's wool business there—a life for which he was entirely unsuited. But in Somerset he was at least able to learn the secrets of wood and moor from old countrymen, and in 1888 his first novel, *Misterton's Mistake*, was pub., and four years later he decided to give up a commercial life for literature. The first book he wrote after becoming a professional author was *Gentleman Upcott's Daughter* (1892), which appeared under the pseudonym of 'Uncle Tom Cobleigh' and which shows something of his admiration of the work of the Dorset dialect poet, Wm. Barnes. After a short time in London he soon wearied of what to him was an artificial and enervating life and went to Withypool, an Exmoor vil., where he rented a cottage at a halling a week (1905), an episode in his career which he felicitously describes in his *Book of Simple Delights* (1906), a work which reveals his powers as a rural essayist and portraitist. Among the works of R. which are worthy of study to-day should be mentioned *The Book of Simple Delights* (1906); *The Book of Crafts and Characters* (1907); and *English Country Life* (1910)—the second of these pub. in the Dent Memorial Edition.

Raymund, Lully, see LULI, RAIMON.

Raymund of Fitero, St. (d 1163), b. in Aragon. A Cistercian, he founded Fitero Abbey in Sp. Navarre. When the city of Calatrava was in danger from the Moors he founded the military order of Calatrava for its defence. Under his leadership the order acquired great fame in Spain.

Raymund of Peñafort, St. (1175-1275), b. at Vilafranca. After being a priest at Barcelona he joined the Dominican order in 1222. Gregory IX., whose confessor he became, charged him with the codification of the canon law, and his five books of decretals, completed in 1234, remained the standard authority until 1917. He became master-general of his order in 1238.

Raynaud's Disease, disease of the nervous centres characterised by three stages. The first stage, known as local syncope, is marked by numbness and whiteness of the extremities, such as the fingers, toes, ears, and nose. The condition is usually symmetrical and points to the circulation being restricted for the time being. The second stage is known as local asphyxia. The fingers, toes, and ears are most commonly affected. The parts become discoloured and swollen, and all sense of touch is lost. Sometimes this condition is accompanied by hemoglobinuria. The third stage, fortunately rare, is known as local or symmetrical gangrene. The parts affected become gangrenous, exhibiting small areas of blackened and shrivelled appearance, which may become extensive in severe cases. The cause of the disease is not definitely known. The symmetrical disposition of the affected areas points to a central nervous origin. It is probable that a spasm of the arterioles restricts the circulation in certain parts, with resulting anaesthesia and ultimate gangrene if the condition be prolonged. The disease may proceed through all three stages; it may be arrested at the first or second; or it may commence with local asphyxia without any preliminary syncope being noticeable. Sudden cold is said to initiate an attack, and the treatment should aim at avoiding low temps.; massage of the affected part is valuable, and electrical treatment can be applied. Congestion treatment of the extremities has been found valuable, but all gangrenous matter should be separated as soon as possible. The prognosis depends upon the extent of the gangrene.

Ray Therapy, see RADIUM, Radiotherapy.

Rayon, see ARTIFICIAL SILK.

Razakars, see under HYDERABAD, History.

Razor (O.F. *rasor*; Lat. *rasare*, to scrape), cutting instrument, used chiefly for shaving the beard. The manu. of R. demands a high quality of cast steel and workmanship for forging and grinding. Good quality Rs. are produced in Germany and the U.S.A., but the processes are similar to those followed in the cutlery trade of Sheffield, Yorkshire. The steel is first supplied in bars whose thickness is represented by the maximum thickness of the completed R. The forger fashions a portion of the bar into the rough form of a R.; the blade is then more completely shaped on the anvil, the required amount of concavity effected, a good edge put on, and the tang drawn out. The blade is next dry-ground; this removes all trace of oxide and hollows out the metal still more completely to a fine edge. The

process of hardening is then carried out by heating the metal to a bright red and plunging it into cold water. This makes the steel very brittle, rendering tempering by loss extreme heating and cooling necessary. Wet-grinding on stones varying in diameter from 2 in. to a foot then serves to bring the edge to a fine, almost uniform sheet. The processes of polishing involve applying the blade to a wheel covered with a tin-lead alloy, and supplied with emery-powder paste. When the requisite degree of polish has been attained the blade is jointed into a haft made of bone, ivory, horn, or celluloid. Hollow-ground Rs. may be whetted time after time for years without the necessity for regrounding, and have altogether superseded the flat-ground form. Safety Rs. of various types have become popular; their essential feature is the provision of a guard which smooths out the skin as the blade comes in contact, thus reducing the risk of cutting. The blades of most safety Rs. are not meant to last and may be purchased for a few pence. Recently, however, safety Rs. have been made to enable certain blades to be stropped or resharpened.

Razor-backs, see FIN-WHALES.

Razorbill, or Black-billed Auk (*Alca torquata*), only remains of species of a genus which included the now extinct great auk (*A. impennis*). It breeds on the sea rocks on various parts of the Brit. coasts, making no nest, and laying only one egg, which is white with brown markings. The R. is about 18 in. long; the head, neck, and upper surface are glossy black, and the breast and under parts pure white. The black beak is large and much compressed, and the end is curved. The bird is a capable swimmer and diver.

Razor-shell (*Solen*), genus of widely distributed lamellibranch molluscs with very elongated shells, the valves of which are open at both ends, and are almost straight. The foot is highly developed; it can be pointed or contracted for boring with great rapidity into sand, and with it the R. can retain so tight a hold that the foot often has to be torn off before the creature can be removed. *S. siliqua* and *S. ensis* are Brit. Both are edible, and though now not much eaten, were considered a delicacy by the anc. Gks.

Razure, see ERAZURE.

Ré, or Rhé, fle de, is. with an area of 28 sq. in. off the shores of the dept. of Charente-Maritime, France, 6 m. W. of La Rochelle. It has vineyards, orchards, salt deposits, cornfields, and oyster fisheries (this is the prin. industry). St. Martin is the cap. Pop. 10,000.

Read, Herbert (b. 1893), Eng. poet and critic, b. at Kirby Moorside, Yorkshire, educated at Crossley's School, Halifax, and Leeds Univ. He served during the First World War from 1915 to 1918, his war poems being among the best of their kind. From 1919 to 1931 he was assistant keeper at the Victoria and Albert Museum, devoting himself to literary criticism and aesthetics: *Reason and Romanticism* (1926); *English Stained Glass* (1926); *English Prose* (1928); *The Sense of Glory*

(1929); *Wordsworth* (1930); and *The Meaning of Art* (1931). His poems, 1913-26, remarkable for their metaphysical power and imagery, were collected in 1926, and again in 1946. In 1930 he delivered the Clark Lectures at Cambridge, on Wordsworth. R. was also Watson Gordon prof. of fine art in the univ. of Edinburgh, 1931-33; Sydney Jones lecturer in art, Liverpool Univ., 1935-36; and ed., *Burlington Magazine*, 1933-39. Other pubs. include *Form in Modern Poetry* (1932); *Art and Industry* (1934); *In Defence of Shelley* (1935); *Art and Society* (1936); *Poetry and Anarchism* (1938); *Annals of Innocence and Experience* (1940); *Thirty-five Poems* (1940); *The Politics of the Unpolitical* (1943); *Education through Art* (1943); *A World Within a War* (poems, 1944); *A Coat of Many Colours* (essays, 1946); *Collected Poems* (1946); and *The Innocent Eye* (1947). See studies by H. W. Hausermann, 1938, and H. Trecco, 1941.

Reade, Charles (1811-84), Eng. novelist and dramatist, b. at Ipsden, Oxfordshire, was in 1835 elected a fellow of Magdalen College, Oxford, but lived mostly in London, and moved in Bohemian circles to the great scandal of his academic confreres. In 1851, when he was serving as vice-president of Magdalen, he began his literary career with a tragedy, *Angelo*, which was produced at the Olympic in 1851. In the following year he wrote in collaboration with Tom Taylor the popular comedy *Masks and Faces*, which he turned into the novel, *Peg Woffington* (1853); but the play, though it has effective scenes, is tawdry. R.'s next novel, *Christie Johnstone* (1853), is one of his masterpieces, and the character of the poor old Scottish peasant and her blessing linger always in the memory. Then followed *It is Never Too Late to Mend* (1856), an exposure of the prison system, and many other novels and plays which do not call for detailed mention. R. stands or falls by *The Cloister and the Hearth* (1861), and there can be little doubt that he will stand by this for many generations to come. It is one of the greatest of historical novels. Its survey of the customs of Holland and Germany, of France and Italy, in the fifteenth century, just before the Renaissance, the knowledge it displays, its vast scope, its characterisation, its tenderness, and its pathos, above all its sincerity, make it a work to read and to re-read. It is a dashing tale of adventure, of fights with leopards, bloodhounds, bears, robbers; but its chief merit is the love story, so sad and exquisite. *Hard Cash* (1863) is an exposure of the private asylum. See lives by R. F. Littledale, 1884; W. C. Phillips, 1919; and M. Elwin, 1931, 1948.

Reading, Sir Rufus Daniel Isaacs, first Marquess of (1860-1935), of Jewish descent, Eng. judge and administrator, second son of Joseph Michael Isaacs, of London, fruit merchant. Educated at Univ. College School (London), Brussels, and Hanover, he went as a boy on a coal-ship running to Rio de Janeiro, for two years; later he was his father's agent at

Magdeburg, went on the Stock Exchange, and finally studied law, being called to the Bar in Middle Temple, 1887. His knowledge of the city brought him forward almost immediately in company actions, and within a few years he had one of the largest practices at the Bar; he took silk in 1898. Liberal M.P. for Reading, 1904-13, he became solicitor-general and was knighted on the elevation of Sir Samuel Evans to the bench. March 1910, becoming attorney-general the following Oct., in succession to Sir W. S. Robson (made lord of appeal). In 1912, somewhat in defiance of usage, he was admitted to the Cabinet while still holding the post of attorney-general. On Oct. 20, 1913, he became lord chief justice of England. He was made Baron R. of Erleigh on Jan. 9, 1914, and Viscount R., June 26, 1916. He was president of the Anglo-Fr. Loan Commission to U.S.A., 1915. The outstanding incident of his chief justiceship was his presiding over the trial of Roger Casement for treason, June 26-30, 1916. R. was special envoy to U.S.A., 1917, and was made earl of R., Dec. 20, 1917. Special ambas. to U.S.A., 1918-19, in 1921 he vacated the chief justiceship, and became viceroy of India. His period of office coincided with the rise of Gandhi (q.v.), with whom he had sev. interviews. His telegram of March 7, 1922, to the secretary of state gave, when pub. (see MONTAGU, E. S.), the finishing stroke to the pro-Gk. policy of the treaty of Sèvres. He was obliged in 1924 to use his special powers to carry the budget without consent of the assembly. He visited England in 1925 to confer with the home gov. as to reforms in India; and he brought about the abdication of the Maharaja of Indore, suspected of complicity in a murder. He strengthened Britain's moral claims to Indian support by combining a policy of benevolent patience with even-handed justice. His term expired early in 1926, and on May 7 he was made marquess. As a member of the Indian Round Table Conference, he put forward the outline of a scheme of All-India Federation, with responsibility at the centre, and due transitional safeguards (1931). In that year he was appointed foreign secretary in the National Gov. (q.v.), but relinquished the post in favour of Sir John Simon following the general election of that year. He was the first of Jewish race to fill the offices of lord chief justice of England, viceroy of India, and foreign secretary, and his career, full of romance, is unparalleled in our later legal and political annals. See life by his son, 1943-45.

Reading, 1. Cap. of Berkshire, England, 36 m. by rail W. of London, on the Kennet, at its confluence with the Thames. Here is the huge biscuit factory of Messrs. Huntley & Palmer. Palmer Park, second only to Prospect Park (120 ac.), was the gift of George Palmer; here also are Sutton's seed-testing grounds. There are also iron foundries, boat-building yards, and engineering works. R. being an important junction on the W. Reg'n railway. The univ. (opened in 1892 as a univ.

college, and raised to univ. status in 1926), which accommodates its students in Wantage Hall, St. Andrew's Hall, and other buildings, provides an excellent training in agriculture, besides the usual courses for degrees. R. is the centre of instruction in dairying for the Brit. Isles. The grammar school (founded by Henry VII. in 1486) now ranks with the lesser public schools; among its pupils was Archbishop Laud, a native and benefactor of the tn. As many as nine Parliaments were at different times (1432, 1451, etc.) held in the wealthy Benedictine abbey (founded in 1121), whose consecration in 1164 was solemnised by Becket in the presence of Henry II. A Dan. encampment in 871, R., or rather 'Rad-ynges,' is credited with thirty houses at the time of the Domesday survey, whilst in the sixteenth century a writer explains that the tn. 'chiefly stonldith by clothing.' It sends two members to Parliament. Pop. 114,600. 2. Cap. of Berks co., Pennsylvania, U.S.A., on the Schuylkill R., 58 m. N.W. of Philadelphia by rail. In a coal- and iron-mining dist., it has steel and railway repair works, iron foundries, and rolling mills, and many manufs. Pop. 110,600. 3. Tn., in Middlesex co., Massachusetts, U.S.A., 12 m. by rail N.W. of Boston, manufacturing furniture and boots. Pop. 10,900.

Real, term used by lawyers with the primary significance of things permanent or immovable, as lands or tenements (see REAL PROPERTY, PERSONALTY, and PROPERTY). A R. right, or *jus in re* in Scots law, is a right of property in a thing in virtue of which the person vested with the right may sue for possession of the thing into whosesoever hands it may go. A R. composition is an agreement between the owner of lands and the parson or vicar, with the consent of the ordinary, that such lands shall be discharged from payment of tithes in consequence of other land being given to the parson in satisfaction thereof. In Scots law a R. burden as opposed to a personal burden denotes an imposition of money on the subject of a right in the deed by which the right is constituted, a personal burden being merely imposed on the receiver of the right. Bentham also used the term in connection with evidence, meaning by R. evidence that which is afforded in any particular case by material objects, as for example, by weapons, a jemmy, etc.

Real, Sp. silver coin worth a quarter of the 'peseta' which is still current in Mexico and other old Sp. possessions. The Portuguese R. is valued at forty reis.

Realgar, or Ruby Sulphur, sulphide of arsenic; formula As_2S_3 . It is found native as orange-red monoclinic crystals, of hardness 1½-2 and sp. gr. 3.5; it is also found as an incrustation in the neighbourhood of volcanic exhalations. The artificial di-sulphide (As_2S_5) is obtained by fusing together arsenic and sulphur. It is readily fusible, and can be made to sublime easily. It is used in pyrotechny and was used as a pigment until superseded by lead chromate. The name is of Arabic origin.

Realism (philosophy), an interpretation of life as opposed to idealism (*q.v.*). It involves the beliefs that time, space, and their attributes are real (transcendental R.), that phenomena exist apart from our consciousness or conception (empirical R.), and that our perception of them is governed by direct intuitive cognition, not by the mediate process of representative ideas. It has figured in philosophy from the beginning; *e.g.* Socrates, Plato, Aristotle. During the Middle Ages the term R. was used in scholastic philosophy to denote the teaching of the 'reality' of universal ideas; R. was thus contrasted with nominalism (*q.v.*). St. Thomas Aquinas (*d.* 1274), and Duns Scotus (*d.* 1308) were realists. Modern R. has important teachers in Sir W. Hamilton (natural and hypothetical R. or dualism), Herbert Spencer (transfigured R.), G. H. Lewis (reasoned R.), and others, and is chiefly a reaction against idealism. The term R. as used to signify certain types of art and literature is also the result of anti-idealistic reaction; its disciples claim to present life as it really is, both its joy and sorrow, its beauty and ugliness, the imperfections being generally emphasised (*e.g.* Zola, Dostoevsky, Thomas Hardy).

Reality. Consideration of R. is the primary difficulty in an philosophical discussion, since it involves the question of the existence and the nature of matter. Many philosophers have urged that matter does not actually exist apart from essential idea, *i.e.* that R. is relative, not absolute. What is commonly understood by R., they say, is nothing more than appearance. R. itself in its ultimate truth being the unknown object of all metaphysical inquiry. It is conceivable that between appearance and R. there is a qualitative change, *e.g.* science reduces matter to electric energy: Berkeley and other idealists regard it as an idea or group of ideas existing in the mind of God, and so on. On the other hand, realists and materialists assert that thought, mind, or consciousness apprehends but does not create matter. The term 'real,' therefore, implies the state of being or existence; thus any notion or concept has necessarily the quality of R. Yet R. is opposed to concepts which are neither true nor false and which fallaciously involve the element of existence. The term 'unreal' is, therefore, one of purely psychological relativity, expressing illusions and hallucinations as distinct from phenomena or sense-impressions. On broader grounds it is clear that when the term 'unreal' is employed, it denotes not a negation but a difference in order and degree of R. In logic R. is used as distinct from, and intermediate to, the extremes of (a) possibility, *i.e.* the fact that with certain conditions a thing may be affirmed as existing; and (b) necessity, *i.e.* the fact that with certain conditions a thing must be affirmed as existing.

Real Presence. In Rom. Catholic theology, the substantial presence of the body, blood, soul, and divinity of Jesus Christ in the bread and wine of the eucharist after consecration. According to the Rom. Catholic Church, this is

effected by transubstantiation, *i.e.* the 'substance' of the bread and wine is changed while the 'accidents' (appearance, weight, etc.) remain the same.

Real Property. Div. of property into real and personal is the cardinal div. in Eng. law (*see* PERSONAL PROPERTY). The old term for R. P. was 'lands, tenements, and hereditaments,' the later term 'real' being derived from the old remedy for dispossession (*see* under PERSONALTY, EJECTMENT). R. P. comprises (1) immovables (excluding leaseholds, which are personal property), which are further subdivided into (a) corporeal, *e.g.* lands, houses, hereditaments (*see* also HEREDITAMENTS), and (b) incorporeal, *e.g.* tithes, rents, advowsons, reversions; (2) incorporeal hereditaments, *e.g.* water-courses, rights of common (*see* INCORPORAAL 'HATTLES AND HEREDITAMENTS'); (3) personal property 'notionally' converted in equity into R. P. (*see* also CONVERSION); in other words, money or money's worth ordered by a testator or other person disposing of property to be laid out in the purchase of land; and (4) certain shares in joint-stock companies, *e.g.* in the former New River and the Avon Navigation Companies, though these shares have now been converted into port stock. R. P. chiefly differs from personal property in (1) its susceptibility from feudal times of being limited or marked out into estates (*see* ESTATE; LIMITATION OF ESTATES). In personality some may have the income for life and others the corpus in absolute ownership, but there are no estates. (2) R. P. on intestacy, prior to the Administration of Estates Act of 1925, devolved on the heir, personality on the next-of-kin (*see* further under HEIR; SUCCESSION; TESTATE). (3) The beneficiary, under a will, of R. P. is called the devisee, of personality, the legatee; but since the Land Transfer Act, 1897, under which all property vests in the first instance, this distinction is of less importance. (4) Personal property is liable as assets in priority to R. P. for the liquidation of the deceased's debts, in the absence of provision by the testator to the contrary. (5) R. P. is said to be conveyed (*see* CONVEYANCING); personality only is said to be assignable (*see* also PROPERTY; LAND LAWS; and LAND).

Reaping. In the beginning of the nineteenth century cereal crops were harvested, as in prehistoric times, by means of the R. hook or sickle. This tool is still indispensable in dealing with badly lodged crops, but its use is very slow, half an acre being the utmost a man can cut in a long day. The scythe had long been used in cutting hay, but was not satisfactory for corn until a cradle of iron or wood, to lay the stalks in a swathe, was provided. It is still sometimes used to cut a roadway round each field for the machine to start. A R. machine was first introduced by the Rev. Patrick Bell in 1826. It only cut the corn and laid it in a swathe at the side. This was followed by manual delivery reapers, which required a man to remove the sheaf from the machine, and self-delivery reapers, which,

by means of revolving sails, discharged the sheaf to the ground. The sheaves were then generally tied with bands of corn by gangs of men stationed round the field. About 1885 the binder, which gathers the sheaf, ties it with string, and throws it off the machine, was introduced. This is a very complicated machine, and its employment, resulting in the cheapening of corn, has been of great importance to the human race. The binder, which may be tractor or horse drawn, can, depending on size, cut 6 or 8 ft. at a time and cover as much as 20 ac. in a day. When working, the sails of the binder gather the cut corn on to an endless canvas belt which feeds it to an incline where it is pushed or accumulated, until a sheaf large enough to depress a lever causes a curved arm, threaded with string, to rise and encircle the bundle with a cord, which is then knotted and cut, when a pair of arms discharge it. The sheaves must then be traved (stooked or shocked) to protect them from the weather and from premature germination which might occur on the ground. In some cases the corn, particularly oats and wheat, is cut early to prevent 'shelling,' and final ripening takes place in the trave. The corn is then carted and stacked, and the stack thatched, to await thrashing (*q.v.*).

This process is eliminated by the combine harvester, which cuts and thrashes in one operation. The combine can be one of three types: (1) tractor drawn and powered; (2) tractor drawn and self-powered; (3) self-propelled, of which the last is the most important and generally used, having its cutter bar, which is similar to that of a binder, in front, enabling a direct approach to the work. The thrashing mechanism is like that of a stationary thrasher. All grain must be dead ripe before being 'combined' to limit, as far as possible, the necessity of drying before storage.

Rear-Admiral, *see under* ADMIRAL.

Reason, term used in logic and philosophy with many different meanings. In ordinary usage it may be taken as equivalent to common sense and opposed to prejudice. *See* LOGIC; RATIONALISM; PHILOSOPHY; PSYCHOLOGY; KANT, etc.

Réaumur, René Antoine Ferchault de (1683-1757), Fr. scientist, b. at La Rochelle, nicknamed the 'Pliny of the eighteenth century.' An able and observant natural historian, he left behind him an exhaustive hist. of insects (1734-42). Besides discovering the white opaque glass and the famous thermometer which bears his name, he wrote monographs on subjects so different as turquoise mines and the silk of spiders, auriferous rivers, and the manuf. of tin. For his thermometer R. used a mixture of $\frac{1}{2}$ alcohol and $\frac{1}{2}$ water, and called the freezing point 0° and the boiling point 80°.

Réaumur Thermometer, *see under* THERMOMETER and THERMOMETRY.

Rebab, *see under* VIOLIN.

Rebate, allowance or reduction of price made for prompt payment, etc. **Rs.** of customs duties are granted on damaged goods, and gas and water companies often

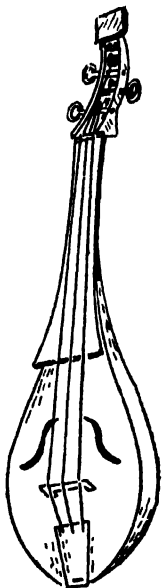
distributed some of their profits in the form of a R. of the rates charged. **Deferred R.** is a commercial practice which has had a certain vogue, particularly with large trusts and their agents or distributors. As the term implies, it is a R. which does not appear on the invoice, but is deferred in some cases for six, in other cases for twelve months, provided certain conditions are fulfilled. Amongst these conditions, it may be stipulated that the trader shall enjoy such R. provided he (1) does not retail below a certain agreed figure the goods of the corporation granting the R.; (2) agrees not to sell or display similar wares of a rival organisation. Should such conditions be broken, the contract becomes void and the retailer may forfeit his claim to the deferred R., which in many cases represents a considerable percentage on the original invoice figure. By the advocates of the system it is maintained that the process keeps the trader on good terms with the larger corporations, on account of the reward which is offered after certain periods of 'good behaviour,' and helps in the suppression of rival concerns. The system was used by some of the larger shipping combines, particularly in respect of freight traffic, where for reasons of economy it is eminently desirable to maintain a regular flow of freightage on those lines of tramp steamers where short cargoes very often spill loss.

Rebec, or **Rebeck** (Arabic *rehabi*), musical instrument of Arab origin, popular in the Middle Ages, and the immediate forerunner of the viol family and the ancestor of the violin family, though its shape was more like that of the mandolin, which is probably one of its descendants. It was introduced into Europe from the R., and was either pear-shaped (tapering to the neck) with three strings, or boat-shaped with two strings, and was played with a bow. It survived in France until the eighteenth century, but only as a street instrument.

Rebekkah, wife of Isaac, who by craft secured for her younger son, Jacob, the blessing which Isaac intended for the elder, Esau (Gen. xxvii.).

Rebus, enigmatical representation of some phrase, name, or thing, by pictures or words.

Récamier, Jeanne Françoise Julie Adélaïde, Bernard, Madame (1777-1849), Fr. society leader, b. at Lyons, perhaps



REBEC

the finest representative of those women who swayed the *salon*, and thus became an unacknowledged legislator. In her teens she was married to M. Jacques R., a rich banker and about thrice her age. A record of the splendid social triumphs of Mme R. would involve notice of nearly all that was distinguished in Paris during a space of about fifty years. To the famous Madame de Staël she was bound by ties of extreme affection and intimacy, and the most distinguished *ami* of her later years was M. de Chateaubriand. She died of cholera, a disease of which her dread had always been great. Her *Souvenirs et correspondance*, ed. by Mme Lenormant, were pub. in 1857. See N. Williams, *Madame Recamier and her Friends*, 1901; E. Herriot, *Mme Recamier et ses amis*, 1904, 1934; and Margaret Trouncer, *Madame Recamier*, 1949.

Recanati, city in the Marches and 8 m. N.N.E. of the tn. of Macerata, Italy. It has a fine fourteenth-century Gothic cathedral and monuments to Gregory XII. and Leopardi, a native. Pop. (com.) 17,700.

Recaptulation (biology), see BIOLOGY; HAECKEL, ERNST.

Receipt, written discharge of a debtor on payment of money, or an acknowledgment in writing of having received a sum of money or other valuable consideration (q.v.). A R. for part of a sum of money due will not operate to discharge the debtor of the residue even though it be expressed to be in full satisfaction, unless there be some consideration given to the creditor for so forgoing the rest of his legal demand. A R. is evidence of payment of a debt, but may be upset by counter-evidence to the effect that it was given under a misapprehension or obtained by violence, duress, or fraud. A R. for £2 and upwards must bear a twopenny stamp, which may be either adhesive or impressed. If unstamped it will be admissible in evidence only on payment of a penalty of £10. Again any person who gives a R. and refuses to stamp it or divides it with intent to evade the duty is liable to a similar penalty.

Receiver, a R. is an individual (usually an accountant, though sometimes the liquidator of a company) appointed in certain cases by a court of equity upon the application of creditors, or other interested parties, to receive income and pay debts. The court can appoint a R. whenever it appears to be just or convenient to do so. R.s. are usually applied for in debenture-holders', mortgagees', and partnership actions. When appointed the R. acts for the benefit of all the creditors, and not merely the creditor or creditors who applied for the appointment to be made. A R. may be appointed as R. and manager to carry on a business, but unless expressly appointed manager he has no powers of management. The court gives managerial powers over and above those of a mere R., only with a view to sale or realisation of the assets, for the simple reason that the court (a R. being deemed an officer of the court from the date of his appointment) will not under-

take the permanent management of any business. The main duties of a R. are to collect and receive rents, profits, or income, get in outstanding assets, pay and discharge ascertained debts or liabilities, and take proper receipts for such payments. Interference by third parties with the possession of a R. may be restrained by injunction, and may also render such parties liable to committal for contempt. The Dept. of the Official Rs. in Bankruptcy (High Court, Bankruptcy Buildings, Carey St., W.C.) consists under the Bankruptcy Acts of 1914 and 1926 of a senior official R. and official R. and assistants. Official R.s. are also appointed for co. court dists. A list will be found in the current law list. Under the Companies Act (1929) there exists a Dept. of Official Rs., Companies (Winding-up), High Court.

Receivers, Radio, see RADIO and RADIO RECEIVERS.

Receiving Order, order by a court for the protection of the estate of debtor who has committed an act of bankruptcy. It may be made either on the petition of a creditor or creditors to the amount of £50 and presented within three months of the act of bankruptcy, or on the petition of the debtor himself, alleging that he is unable to pay his debts.

Receiving Stolen Goods. A receiver of stolen goods is liable either as an accessory after the fact or as a prin. offender. It is essential to prove that the goods were stolen; but if the only witness to such original stealing be the thief himself, the judge ought to direct an acquittal of the alleged receiver. It must also be established that the goods were received by the accused into his actual possession, a joint possession with the thief being insufficient; the mere fact that stolen goods are found in the accused's possession is good presumptive evidence of his having received them. Lastly guilty knowledge must be proved; this may be effected either directly by the evidence of the thief, or circumstantially by showing, for example, that the receiver bought at a gross undervalue, denied that he had the goods in his possession, or (perhaps) that he was in possession quite recently after the theft. The punishment for R. S. (i. e. may extend to penal servitude for fourteen years, but if the theft were a misdemeanour (as, for example, if the thief obtained them by false pretences) the maximum sentence is seven years.

Rechabites, anct. Jewish religious order, founded by Jehonadab, the son of Rechab. The object of the founder was the perpetuation among his own posterity of his nomadic style of life, and with this view he prescribed various rules, the prin. of which were to refrain from building houses and to eschew wine. (2 Kings xv. 10; Jer. xxxv.).

Rechabites, Independent Order of. Friendly society for total abstainers, estab. at Salford, Lancashire, Aug. 25, 1835. It promotes temperance teaching and propaganda, and makes provision for sickness, death, endowment, and other similar benefits to members. It has over 4000

branches, called tents, in the Brit. Isles and dominions. The membership at Dec. 1948 was 500,000, and the total funds £1,000,000.

Recife, or Pernambuco, cap. of Pernambuco state, and seaport of N. Brazil, on the E. extremity of S. America. An opening in one of the reefs permitting access to the calm lagoon behind it provides a small natural harbour for the port of R. Sugar and cotton thrive in the area because of the hot and humid climate. The city exports sugar, rum, hides, cotton, fruit, and dyewoods. It comprises three quarters. Of these the oldest and most densely populated is São José do R. The more spacious Santo Antonio, on the is. of Antonio Vaz, sprang up during the Dutch occupation (1630-54); it is a flourishing commercial port with customs house, exchange, warehouses, etc. Bon Vista is modern and mainly residential.

R. is one of the earliest Portuguese settlements in Brazil, a successful colony being founded at Olinda, near the site of R., in 1537. Pop. 384,400.

Reciprocal. If a quantity be represented by a/b , its R. is b/a . Tables of the Rs. of the common numbers are prepared for mathematical calculations; in this case the R. of n is $1/n$.

Reciprocating Motion, oscillation in a straight line of a portion of machinery, e.g. the piston in the cylinder of an engine; the reciprocating parts affect the balance of the engine, and the vibration and shock due to their motion have to be minimised. See STEAM ENGINE.

Reciprocity. Shortly expressed, the theory of R. of exchange in international trade means that a given country should decline to receive imports from another country except on condition that the latter accepts the commodities of the former in return. A modified form of R., adapted to the conditions of international trade, exists, and has existed for a century, in the shape of commercial treaties (q.v.). Such treaties cannot in the nature of things be consistent with Free Trade principles, because their very existence presupposes the existence of a tariff in both the contracting nations. England, for example, at the time of Cobden's treaty with France in 1860, was not a free-trade country; for in consideration of France substituting for its prohibitive (see PROTECTION) duties moderate protective duties not exceeding a maximum *ad valorem* charge of 30 per cent., England agreed to abolish all its outstanding duties on foreign manufactured goods. In modern politics commercial treaties have taken a prominent place, especially since the Imperial Economic Conference of 1932. (See also IMPERIAL CONFERENCE; MERCANTILE SYSTEM.)

Recitative. Declamation is singing, with fixed notes but without definite metre or time, comparable to prose inserted into verse drama. But although the notes are fixed by notation, they are not always, or should not always be, sung with full tone or even very definite intonation; on the other hand, although

the time is free, in musical notation R. is generally written down by convention in 4-4 time, with bar-lines. There are, broadly speaking, two kinds of R., as follows: (1) *Recitativo accompagnato* (or *stromentato*). A type of R. accompanied by the orchestra, as distinct from *recitativo secco*, which in the eighteenth century was accompanied by a harpsichord. *Recitativo accompagnato* served to modulate to or near the key of the set musical number, usually an aria, that followed it, and also to give the singer an opportunity for dramatic declamation. (2) *Recitativo secco*. A type of R. accompaniment by the harpsichord, mainly in eighteenth-century It. or Italianate opera. The composer's score showed only the voice-part and a figured or unfigured bass; the harmony was supplied by the player according to conventional rules and Rs. were never intended to be of musical interest, but merely to advance the action without letting the music drop out altogether and give place to spoken dialogue. It also served to modulate from the key of one set musical number to the next. R. owes a traditional origin to the dramatic recitation, whence is derived the medieval plain-song, the greatest examples of R. descended from the latter being Handel's oratorios and Bach's cantatas. The success of such works as Haydn's *Creation* and Weber's *Der Freischütz* owes much to the pictorial Rs.

Recklinghausen, tn. of Westphalia, Germany, 30 m. S.W. of Münster. It is a centre of the N. Ruhr coalfield and is noted for iron-works and manufs. of machinery, linen, and beer. Pop. 87,400.

Reclamation of Land, see LAND RECLAMATION.

Recluse, see ANCHORITE.

Recognition, in law, an obligation of record which a man enters into before some court of record or a magistrate, binding himself to do some particular act, e.g. to be of good behaviour for a specified period, to come up for sentence if called upon, to appear as witness, or to pay a debt (see BAIL). It resembles a bond, the form of it being, 'that A B doth acknowledge to owe to our lord the king, to the plaintiff, C D, or the like, the sum of £10 with condition to be void on performance of the thing stipulated.' If the condition of the R. is broken, the R. becomes forfeited, and is then *extrated* or *extructed* from the other records and sent up to the Exchequer. Then the party, and, if the R. was entered into with sureties, the sureties too, become the absolute debtors of the Crown for the sums for which they bound themselves. See also PREVENTION OF CRIME ACTS.

Reconnaissance (Fr. *reconnaitre*, from Lat. *recognoscere*, to recognise), military term denoting the examination of the enemy's position or movements, or of the ground to be occupied. Tactical and strategical Rs. are carried out by aircraft. When a large body of ground forces is employed, with the object of inducing the enemy to show his hand, the operation is termed a R. in force. This is also a favourite euphemism for an abortive

attack. Much R. is done by armoured cars in favourable terrain. In modern warfare the use of aircraft has, of course, vastly extended the possibilities of successful R. and indeed so revolutionised R. as to make secrecy of dispositions impossible without command of the air. Topographical Rs. have for their object the securing of information on the peculiarities and details of the position, hills, rivers, cover, etc., and are carried out by skilled officers and men. The term R. is also applied to the preliminary surveying operations preparatory to the building of a railway, canal, etc. *See also* PATROLS.

Record, or Court of Record. A court of R. is one 'where the acts and judicial proceedings are enrolled on parchment for a perpetual memorial and testimony (Blackstone). The distinguishing mark of a court of R. is the power to inflict fines and to attach a person for any contempt of court; while the practical effect of the distinction between courts of R. and those not of record is that the rolls and records of a court of R. are incontestable evidence of what purports therein to have been done, whereas the proceedings of courts not of record must be proved like any other question of fact. The description goes back to the records of royal authority, and originally the king's council or Curia Regis (*q.v.*) (*see* PRIVY COUNCIL; CABINET) was the only court of R. But gradually, as the different offshoots of that body developed, these, as being the king's courts, also became the courts of R. (*see* ROYAL COURTS OF JUSTICE), and their rolls absolutely authoritative save for inadvertent errors of an obvious kind. The courts of appeal (including the House of Lords) and the high court of justice constitute the superior courts of R., and the only inferior courts (*q.v.*) invested with the attributes of a court of R. are the co. courts. The House of Commons, though constitutionally a tribunal, is not generally regarded as a court of R., and, according to Sir Erskine May, the House has virtually abandoned its claim to the title. In a cognate sense the term R. means in judicial proceedings the written statement of the various steps in an action, from the issue of the writ down to the entry of final judgment, which is drawn up by an appropriate official. Where an action is settled out of court the R. is said to be 'withdrawn.'

Recorder. The presiding judge of a bor. court of quarter sessions is called the R. A R. is appointed by the home secretary during good behaviour, and to be eligible must be a barrister of not less than five years' standing. The same person may hold the recordership for two or more hors. jointly, and may also occupy the position of co. court judge for the same or another dist., be revising barrister for the bor., and mayor, councillor, or stipendiary magistrate. The R. is the sole judge of the sessions, and the mayor or other justices of the bor. have no judicial authority whatever in the R.'s court, except that if the R. or his deputy be absent they can open and adjourn the court and receive recognisances. The remuneration of a

R. is fixed by by-law or resolution of the bor. council.

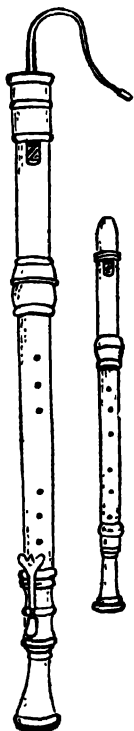
Recorder, old musical instrument of the fipple flute family, ranging from 8 ft. to 1 ft., having a soft and sweet tone (whence known as *flûte douce*) similar to the song of a bird. Under this heading Dr. Scholes includes, for the sake of convenience, all flutes of the whistle-mouthpiece, end-blown type as opposed to those of the side-blown type. The family thus includes not only true Rs., but the flageolet (*q.v.*), tin-whistle, pipe (or tabor), or galoubet. Instruments of the true R. family had eight finger-holes and a compass of about two octaves. It was a very favourite instrument in Tudor times, and is referred to in Elizabethan literature, *e.g.* in *Hamlet* III. ii. and *Midsommer Night's Dream* V. i. It became known as the *flûte-à-bec* or Eng. flute, and was subsequently superseded by the stronger-toned transverse or Ger. flute, but is now in use again, having perhaps been helped in England by the movement for the revival of the folk-dance. *See* C. Welch, *Sir Lectures on the Recorder* 1911.

Recorder, Siphon, instrument invented by Lord Kelvin to replace his mirror galvanometer for recording the variations in the minute currents of submarine cables, which form the signals. The pen is a siphon of vaccination tubing, the short limb dipping into an ink reservoir, the end of the long limb supplying ink to a moving ribbon of paper. The horizontal limb is enclosed in a small coil of wire through which the current passes, and is placed between the poles of an electromagnet excited by a local battery. The ink bottle is electrified, and the paper ribbon carried on an insulated metal roller. The varying current moves the siphon and the electrified ink spurts upon the unelectrified paper, the tube not touching. The pen is not affected by the ordinary earth-currents passing through the cable.

Record Office. *see* PUBLIC RECORD OFFICE.

Records Association, British. *see* under HISTORICAL MANUSCRIPTS COMMISSION.

Recovery, Common. *see* FINES; RECOVERY OF LAND.



RECORDERS

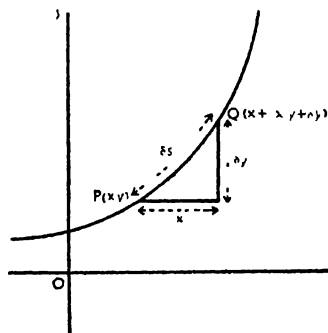
Recovery of Land. The present method of recovering possession of land, whether from a tenant whose tenancy has been determined by notice to quit, or from any one else wrongfully in possession, is by issuing a specially endorsed writ in the high court and applying for leave to sign final and summary judgment by a summons under Order XIV. of the Rules of the Supreme Court. Formerly the legal machinery for recovering land was cumbersome in the extreme, and it was in the last degree essential to distinguish between the recovery of possession and an action to try title. So technical and uncertain in operation were the old real actions for the trial of title (*see* REAL PROPERTY; PERSONALTY) that they very soon in the hist. of Eng. legal procedure became replaced by the personal remedy of ejectment (*see* on this EJECTMENT). Originally ejectment was an action brought by a lessee to repair the injury done him by having been dispossessed, and the various fictions by which it became adapted to the trial of titles to freeholds are a lasting monument to the barbarous inelasticity of the technical rules of the old Eng. common law. It was long a standing rule that no plaintiff should proceed in ejectment against a casual ejector without giving notice to the tenant in possession, if any, and joining him as defendant at his option. Then he had to make good four points, viz. the title of his landlord, his lease, entry, and the ouster or eviction, and, if he succeeded herein, the sheriff put him into possession. Thus the title of the lessor came incidentally before the court and suggested ejectment as an appropriate remedy for trying titles to freeholds. But soon the trouble and formality of actually making lease, entry, and ouster suggested the concoction of a string of fictions, beginning with the entirely false statement of a lease for a term of years by him who claimed title to 'John Doe,' the latter being the plaintiff, and the no less false statement that Doe entered as lessee and that the equally celebrated 'Richard Roe,' the defendant, casually ejected or ousted him. (For a complete statement of this curious and archaic procedure *see* Blackstone's *Commentaries*.) It was not till 1852, when the superior courts of common law were reconstituted, that the old action of ejectment was abolished and the new action for the R. of L. created. Except by leave, no claim other than for mesne profits (*see* MESNE) and arrears of rent can be joined with a claim for R. of L. Ejectment proceedings may also be taken in the co. court where neither the ann. value nor the rent payable exceeds £100. Where the rent does not exceed £20 and the term is for not more than seven years, proceedings may be taken in the police court.

Recruit and Requiring, *see* AIR FORCE, ROYAL; ARMY, COMMISSIONS, RESERVE FORCES, EDUCATIONAL TRAINING, NAVY AND NAVIES.

Rectangle, quadrilateral plane figure of which the angles are all right angles and the opposite sides equal. The area of a R. is equal to the product of two adjacent sides.

Rectangular Projection, projection in which all the meridians are straight vertical parallel lines and the parallels of lat. are horizontal parallel lines perpendicular to the meridians. *See* MAPS, *Rectangular Projection.*

Rectification, in chem., the process of purifying volatile spirits by fractional distillation; they are then known as rectified spirits. In mathematics, the



process of finding the length of curves. In the figure P is the point (x, y) , Q, $(x + \delta x, y + \delta y)$. If s = the length of curve from some fixed point to P, $PQ = \delta s$, then $(\delta s)^2 = (\delta x)^2 + (\delta y)^2$. Hence $\frac{\delta s}{\delta x} = \sqrt{1 + \left(\frac{\delta y}{\delta x}\right)^2}$

i.e. in the limit $\frac{dy}{dx} = \sqrt{1 + \left(\frac{dy}{dx}\right)^2}$
 $\therefore s = \int \sqrt{1 + \left(\frac{dy}{dx}\right)^2} \cdot dx$, where $y = f(x)$, or if

polar co ordinates are used,
 $(ds)^2 = (dr)^2 + r^2(d\theta)^2$,

$$\therefore s = \int \sqrt{r^2 + \left(\frac{dr}{d\theta}\right)^2} \cdot d\theta,$$

or $\int \sqrt{1 + r^2 \left(\frac{d\theta}{dr}\right)^2} \cdot dr$,

where $r = f(\theta)$ and $\theta = f(r)$.

In the case of the catenary $y = \frac{c}{2}(e^x + e^{-x})$,

i.e. $y = c \cosh x/c$, and $\frac{dy}{dx} = \sinh \frac{x}{c}$,

$$\therefore \sqrt{1 + \left(\frac{dy}{dx}\right)^2} = \cosh \frac{x}{c}$$

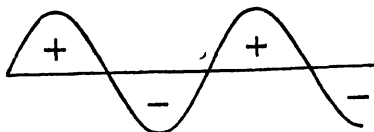
$$s = \int_0^x \cosh \frac{x}{c} \cdot dx = c \sinh \frac{x}{c}$$

If the limits are taken from the origin to the point where $x = a$. In practice the length of curves is found by means of the opisometer (*q.v.*).

Rectified Spirit, alcohol which has been purified and strengthened by redistilla-

tion. In the Brit. Pharmacopœia, R. S. contains 16 per cent by weight of water.

Rectifiers are devices for converting an alternating or oscillatory current into a unidirectional current. The alternating current may be represented as a sine-wave



and the action of the rectifier may be that of inverting the negative half-waves, producing a unidirectional current of the form



(full-wave rectification), or that of blocking the negative half-wave, producing a current of the form



(half-wave rectification). R. may be classified according to their principle of action as mechanical, contact, and discharge R. Of the first, the rotating commutator is a full-wave rectifier and operates on the same principle as the commutator in the ordinary direct current generator, which is in fact a rectifier, since the electromotive force induced in the armature coils is alternating. In the vibrator rectifier, a vibrating spring closes the contact during one half-wave and interrupts connection during the next, the vibration of the spring being adjusted to exact synchronism with the alternating current, and the motion being maintained by a magnet, as the buzzer in an electric bell. The contact R. depend for their action on the curious phenomenon that a potential difference develops in the very thin layer or interface between two chemically different substances in contact. A zinc plate becomes positively charged in contact with a copper plate, the latter becoming negative. The theory of the electric double layer in the interface was developed by Helmholtz and provides an explanation of many phenomena such as frictional electricity, endosmosis, electric charging of capillary tubes in which water is flowing, electrification of air bubbles in water, and water drops and spray in waterfalls. The effect is made use of in the copper oxide rectifier, the selenium, and the crystal rectifier. Clearly if a potential difference is developed at a contact, current passes more easily in direction of the potential difference and the half-wave in the opposite direction is at least partially blocked. Contact R. are widely

used in connection with instruments and apparatus where only small power amounts are involved. The electrolytic rectifier is capable of handling considerable power and depends for its action on the unidirectional current in the cell (see ELECTROLYSIS). Of a different type are the various R. using electric discharges; these depend on the emission of electrons from the cathode, which is usually heated, either independently or by the current itself. In the thermionic valve the cathode is a filament heated by the current from a small battery and the electrons emitted are caught by the (plate) anode; the current thus passes in one direction only—opposite the flow of the (negative) electrons according to common parlance. Hence the name 'valve.' The thermionic valve is used as rectifier in wireless sets, cathode-ray oscillographs, and numerous other apparatus, and the modern type of 'thyatron' has been developed for high voltages and considerable power amounts. The discharge rectifier using a mercury pool as cathode and an iron or carbon anode is one of the most remarkable pieces of electrical engineering equipment developed in modern times. If operated in vacuum it is called a mercury vapour rectifier, if at atmospheric pressure it is known as a mercury arc rectifier. In either case the arc has to be ignited by some means and thereafter a luminous discharge continues to flow, keeping the mercury cathode hot, while the anode is usually cooled to prevent back-firing. The mercury vapour rectifier is extensively used for converting high voltage three-phase current into direct current in traction substations. In this application the rectifier usually has three, six, or twelve anodes placed in a ring with vertical axis, and the three-phase current is converted into current of a corresponding number of phases supplied to the anodes in turn. In this way the fluctuations in the direct current from the half-wave reversals are largely smoothed out. Mercury vapour R. are built for direct current voltages up to 3000 volts, the alternating current voltage being stepped down in transformers. The large-size R. are usually built in sealed steel tanks, the vacuum being kept up by pumps. The mercury vapour rectifier requires no attention; it can be automatically started and operated by remote control. The current is controlled by a grid, as in the thermionic valve. A modern type, the mutator, developed by Brown Boveri, may also be used for converting direct current into alternating current or three-phase alternating current into single-phase alternating current. As a direct current/alternating current converter it will become an essential link in the various projected high-voltage, long-distance, transmission schemes. A limit is set to alternating current transmission by the fact that for very long distance, the transmission of large power amounts required very high voltages, up to and above 400 kV, and the line becomes electrically unstable. This instability does not arise in direct current lines.

At the end of the transmission line conversion into alternating current is required for distribution at lower voltages, which is best carried out by alternating current owing to the facility of transformation of alternating current to a suitable voltage.

Rector, clerk in holy orders who has the cure of a par., and has also full possession of all the consequent rights and privileges. A vicar, on the contrary, receives only a certain portion of the eccies. income set apart to the vicarage. See **BENEFICE**.

Rectum, lower part of the large intestine. It commences at the end of the sigmoid flexure and extends to the anus. The term *R.* implies that this portion of the intestinal tract is straight, but in fact it has a distinct curve, bending backwards and again towards the front. The *R.* has four coats: the peritoneal, which is only present laterally and in front for some part of its course; the muscular, consisting of longitudinal and circular unstriped fibres; the submucous, consisting of aerolar tissue; and the mucous coat, which forms three folds called the *plicæ recti*. The *R.* receives by peristaltic motion the residue of food material from the large intestine. An accumulation takes place until the mass produces a sensation which is interpreted as a desire to empty the *R.* This is accomplished by the relaxation of the interior and exterior sphincter muscles of the anus. The motion of defecation is partly voluntary and partly involuntary; the exterior sphincter is relaxed by an effort of the will, but the inner muscles act involuntarily on receipt of the accustomed stimuli. If from any cause these stimuli evoke no response, the faeces are retained, producing the condition known as constipation. Many of the disorders to which the *R.* is liable are due to constipation. The accumulation of impacted masses may lead to fissures, piles, and other local disorders, besides the general toxic effects. Obstruction of the *R.* is sometimes due to thickening of the mucous coat, foreign bodies, or strictures due to tumours, etc. In women the weakening of the tissues after parturition may lead to a hernia of the *R.* into the vagina.

Reculver, Kent, England, 3 m. E. of Herne Bay, on the S. shore of the Thames estuary. There are remains of the Roman Saxon shore fort of *Regulbium*. The medieval church was demolished in the last century, save for two towers, known as 'The sisters,' which were taken over by Trinity House to serve as a landmark. There are also remains of an interesting pre-Conquest church, columns and a carved stone cross from which are re-erected in Canterbury Cathedral.

Red, *see* under **PIGMENT**.

Red Admiral Butterfly, or *Vanessa atalanta*, Brit. butterfly with black wings crossed by scarlet bands and marked with white and blue spots. The spiny black caterpillar feeds on the nettle. The butterfly is not known to hibernates in Britain, immigrating in May and June.

Red Army, army of the Soviet Union. It had its origin as the army of the Rus-

slan Revolution of 1917, and it was called 'Red' Army because it bore the red flag of the revolution. The name was retained after the revolution, and the Soviet Russian Army is officially styled the *R. A.* of Workers and Peasants, or was so styled until late in the Second World War. In 1940 it numbered about 20,000,000 trained reserves, and soon became highly mechanised. Its air arm was estimated at 7000 first-line aircraft before the Second World War and the number of tanks at more than 10,000, but these totals were much increased as the war developed. It is to be doubted whether any army has adapted itself to modern war conditions as rapidly as did the *R. A.* during the two years 1942-43. Some developments were essential in order to offset the Ger. methods and to employ effectively new types of armament produced by factories, home and foreign; others were the outcome of a realistic policy of obtaining the means by which the human element provided by a quarter of a century of Soviet life could be harmonised with the old Russian military traditions. In the first group can be included measures determining in what conditions, and in the second in what state of mind, the soldier fights.

The Russian Army made a poor showing in the Finnish war of 1939-40. The result of that campaign was that Stalin and the high command undertook a reorganisation of the *R. A.*, including a revision of formations, tactics, and command. Their chief aims were to improve tactics and weapons, and to improve leadership by a careful sifting of army corps and divisional commanders. Two other factors also contributed to their success: simultaneously with the overhauling of the *R. A.* the Soviet Gov. began to put into effect a bold scheme to transfer machinery, and indeed whole industries, eastward from the Ukraine, and particularly from the Donetz basin, and also to accelerate the expansion of the inner industrial fortress beyond the Urals. Later came the delivery of Brit. and Amer. war materials, a flow, however, which became really important only about the time that the Russians had already demonstrated their tenacious grip on Stalingrad. In the Finnish war on the Karelian Isthmus the Russians relied upon massed artillery and steam-roller concentrations of tanks and infantry to break the Mannerheim line. In their long withdrawals from White Russia and across the Ukraine and the Don steppes they gradually perfected an elaborate method of defence in depth, and also anti-tank tactics to make use of their new anti-tank weapons. Eventually, in the winter of 1942-43, and in the summer campaign of 1943, they demonstrated that they could conceive and execute a well-timed offensive. One of the lessons learned in Finland concerned the amount of authority that should be delegated to the political commissars. In 1941 and 1942, for the first sixteen months of the Russo-Ger. campaigns, the *R. A.* operated with officers and commissars on

the dual-command basis, but this command authority was finally removed in Oct. 1942, at the moment when Stalin was preparing the first great Russian counter-offensive. This move was prompted by a Ger. Army order that all political commissars should be shot after interrogation when captured. The Oct. decree provided that the most capable commissars should be withdrawn for courses at officers' training schools. By the spring of 1943 they were back again in active service, under the title of ordinary regimental and staff officers, but with their experience at the front supplemented by new technical knowledge. Meanwhile the remaining commissars and other new ones continued their former work, but there was now a single military command in every unit. Following this reorganisation Stalin found himself confronted with the need of making changes in his high command. In Finland he had relied on his former comrade of civil war days, Marshal Voroshilov, with disappointing results. Similarly, Marshal Budyenny had failed disastrously in the Ukraine. Both were withdrawn to train new armies in the rear. Later he took the same stern line with Marshal Timoshenko. It was in Aug. 1942 that Gen. Zhukov was appointed vice-commissar of national defence directly under Stalin. Until then that important post had been held by Timoshenko. The change was due to the catastrophically swift Ger. break-through at Rostov on July 25, 1942. The disaster at Rostov revealed where fatal weakness still existed in the R. A. machine and paved the way for the great recovery between Nov. 1942 and Feb. 1943. The defence of Stalingrad was entrusted to younger generals, men of strong physique and greater competence, men like Chukov, Rodimtzev, who became heroes of Stalingrad, Lelushenko, the hero of Rzhev, and Malinovsky, the leader on the S. front. After the Ger. and Ger. satellite armies had been flung back across the Donetz the veil of anonymity was lifted. Stalin had emerged as a marshal, a title which his leadership had merited, especially as much of the grand strategy of Stalingrad seems clearly to have been his work. Zhukov had also now become a marshal. Vasilevsky, promoted to marshal in Feb. 1942, was chief of staff. It was these three who planned the great counter-offensive. Now, like Napoleon, Stalin distributed the laurels after they had been won, to Marshal Nikolai Voronov, chief of artillery, and to a growing list of generals, men like Rokossovsky, Vatutin, Golikov, Tolbukhin. The significance of the victory at Stalingrad and the successful winter offensive which followed can scarcely be exaggerated. The R. A. had proved its ability at defence in depth. Now it revealed its mastery of great encircling movements and annihilation tactics. Coincident with its purely military evolution the R. A. had also undergone changes of psychological and political importance. It had much less than formerly the conformation and

appearance of a workers' and peasants' army.

The plan for post-war reconstruction contained provision for nine military schools to train boys between eight and seventeen years of age to become officers in the R. A. Named in honour of Alexander Suvorov, these schools recall, in some respects, the cadet boarding schools of pre-revolutionary days. The extent of the R. A.'s power outside the Soviet federation may depend in the end on whether it has served chiefly for the protection and security of the Soviet state or whether it has become an instrument for another imperialism. Heretofore its chief motivating force has been the flame and faith of Russian nationalism. The general wartime development of the R. A. was in the direction of greater centralisation and unity of command. By the end of the war major formations had become much more uniformly composed and rigidly organised than in other armies. The army groups (known as 'fronts') were commanded by marshals and divided into armies under colonel-generals; corps had been practically eliminated and armies almost all consisted of six divs., which by W. standards were deficient in artillery. The divisional field artillery (both guns and howitzers) was of light calibre, but there existed great quantities of G.H.Q. artillery of all calibres. This was organised in large bodies up to divisional size and together with the armoured troops could be handled in masses by G.H.Q. or fronts on almost strategic scale. This centralisation increased the importance of the General Staff Corps until it probably exceeded that of the Ger. general staff (see STAFF, MILITARY). For the campaigns of the R. A. in the Second World War see EASTERN FRONT, OR RUSSO-GERMAN CAMPAIGNS, IN SECOND WORLD WAR. See D. Fedotoff White, *The Growth of the Red Army*, 1943.

Redbank, tn. of Monmouth co., New Jersey, U.S.A., 26 m. S.W. of New York. Pop. 11,000.

Redbird, see CARDINAL-BIRD.

Red Bush Pig, see RIVER HOG.

Redcar, tn. in the N. Riding of Yorkshire, England, 8 m. N.E. of Middlesbrough. It is a popular seaside resort, with good sands and bathing and golf links. Race meetings are held. Pop. 27,100.

Red Cedar, see JUNIPERUS.

Redcliffe, tn. of Queensland, Australia, so named by Matthew Flinders in 1799 because of the red cliff which he discerned when entering Moreton Bay. It is a peninsula with bayside beaches, within 25 m. of Brisbane, and connected to the mainland by the Hornibrook highway. R. was the first white settlement in Queensland. Pop. 10,000.

Red Comyn, see under COMYN.

Red Cross, The, organisation for the relief of suffering, owes its inception to the Swiss banker, Jean Henri Dunant, who, moved by the sufferings of the wounded at the battle of Solferino (June 1859), pub. *Un Souvenir de Solferino* (1862), urging the formation of voluntary

aid societies, with a permanent existence, to succour the wounded in time of war. As a result an international conference was held in Geneva in 1863, attended by delegates from sixteen European countries, and followed in 1864 by a diplomatic conference which signed the first Geneva Convention. As an emblem of neutrality the convention adopted a R. C. on a white ground (the Swiss flag reversed) and the motto 'Inter Arma Caritas.' The use of the red crescent in Turkey, Egypt, Iraq, Jordan, Syria, and part of the U.S.S.R., and of the red lion and sun in Iran, have been approved. The supreme deliberative authority of the International R. C. is the International Conference, which meets every four years, and is attended by delegates of the R. C. and Red Crescent societies, the international R. C. committee, the league of R. C. societies, and representatives of the govts. signatory to the Geneva Convention. The International R. C. committee is composed of twenty-five Swiss citizens, and has its seat in Geneva. Its main functions are to promote the adherence of states to the Geneva Convention, to afford recognition to new societies, to create international agencies in wartime for the relief of victims of war, especially prisoners-of-war, and to maintain fundamental R. C. principles. The league of R. C. societies, founded in 1919, is best described as a 'parliament' of national societies linked for purposes of co-operation and mutual assistance in peace. Its present membership is sixty-eight R. C. and Red Crescent societies.

Civilian hardships in the Second World War and the ill-treatment of prisoners were among the urgent reasons for revising the protective conventions administered by the R. C. Amended texts of four conventions were adopted provisionally, at Stockholm, in Aug. 1948, by the representatives of fifty govts. and fifty-two R. C. societies; and a conference met at Geneva on April 21, 1949, to examine the new proposals. The conventions revised were: (1) the Geneva Convention of 1929 for the relief of the wounded and sick of the armies in the field; (2) the Hague Maritime Convention for the relief of the wounded, sick, and shipwrecked in the armed forces at sea; (3) the International Convention on the Treatment of Prisoners of War, 1929, all of which were in force when the Second World War broke out. A fourth convention, for the protection of civilians in time of war, was then only in draft, and the absence of any kind of protection was bitterly felt by the nationals of the countries overrun by the Gers. and the Jap. The revised conventions provide for control, inspection, sanctions, and embodiment in national legislation and for the trial of war crimes by national govts. Under the revised conventions, in no circumstances may persons of the local pop. be punished for giving help to the wounded, even to enemy parachutists. An important new chapter of the Geneva Convention of 1929 lays down rules for the protection of army medical personnel,

doctors, orderlies, chaplains, and administration. No prisoner of war may be submitted to physical mutilation or subjected to scientific experiment of any kind. Collective disciplinary measures, especially as regards prisoners' food, are prohibited. Prisoners may do work that is necessary to ensure the housing, clothing, transport, and health of human beings, provided that such work is not connected with military operations. Escaped prisoners who are recaptured can be subjected to disciplinary punishments only. The signatories undertake to apply the convention in the event of civil war, provided that the other side does likewise. Categories of persons to be treated as prisoners of war include civilian members of air crews, war correspondents, and the pop. of a non-occupied ter. who, at the approach of an enemy, fly to arms spontaneously, and persons belonging to a military organisation or an organised resistance movement constituted on occupied ter., provided that notice is given to the occupying power that its members are under the orders of a responsible chief and that they wear a distinctive badge or uniform. They must carry their arms openly and conform to the laws of war. The new convention for the protection of civilians prohibits physical injury, torture, and the taking of hostages, and there may be no execution without previous judgment by a regular court under judicial guarantees. Precise conditions are laid down regarding their employment or internment on grounds of security. Apart from this the substance of the convention is the obligation on the signatories to establish on their ter. neutral zones of security for the safety of the sick and wounded, whether civil or military, with facilities for free passage of medical supplies and provisioning.

In Aug. 1949 sixteen delegations signed the conventions unreservedly, and in Dec. of the same year some twenty-eight other nations, including the United Kingdom, signed with various reservations. The new conventions come into force the following year after the first ratifications had been received.

The Brit. R. C. Society was first active in 1870, and was granted a royal charter of incorporation in 1908. Voluntary Aid Detachments (V.A.D.) were first estab. in 1909. They comprised men trained in first aid, women in first aid and nursing, liable for service with the medical services of the Crown in the event of mobilisation. In the First World War the joint committee of the B.R.C.S. and Order of St. John was estab. Enormous expansion took place and outstanding service was performed; *The Times* fund raised £16,500,000. In 1919 the joint council of the Order of St. John and B.R.C.S. was formed to administer the balance of war funds mainly for benefit of disabled ex-service men. This included the emergency help scheme; after care, settlements, and homes; hospital library service; and home ambulance service. In 1939 was formed a joint war organisation of the B.R.C.S. and Order of St. John,

officially recognised and similar to that which carried out work in the First World War. While the care of sick and wounded servicemen and women, prisoners-of-war, and civilian victims of air raids was the primary work, members also undertook stretcher-bearing, ambulance driving, librarian and diversional therapy in service hospitals; assisted the wounded and missing dept. of the War Office by liaison and searcher work; the care of refugees from abroad, etc. They manned first-aid posts in London tube and other shelters; shared the work of casualty services in air raids, estab. rest centres for homeless and old people, and filled the appointments of over 1000 welfare officers attached to service hospitals at home and abroad. The war organisation opened many convalescent homes and provided equipment and staff commissions, fully equipped with stores, vehicles, and personnel, went out to all war zones as and when army advances made this possible. Personnel also undertook immediate post-war work in the Middle E., N. Africa, Italy, N. W. Europe, S.E. Asia, and Far E. commands. The duke of Gloucester's appeal fund raised £63,000,000. A joint committee of the Order of St. John and B.R.C.S. undertakes the maintenance of those services arising out of war, the relief of disabled ex-servicemen and women, replacing the joint council set up in 1919.

The peacetime work of the B.R.C.S. falls within the following categories: (1) First aid: road posts; ambulance duty; beach huts; air fields; sporting fixtures; camp sick-bays for cadets, scouts, guides; dispensaries in hopfields; industrial undertakings; cinemas and entertainments. (2) Nursing: in hospitals; homes and clinics; nursing aid service under the supervision of dist. nurse; blood transfusion service; medical loan depots. (3) Welfare: hospital welfare; escort duty; home visiting; diversional therapy; work for invalid and crippled children; picture library; care of children; old people's homes and clubs; meals-on-wheels. (4) Immediate relief in disaster: floods, fire, major accidents, etc. (5) Work carried out under the joint committee. In addition welfare work in service hospitals is carried out by the society and the Order of St. John jointly. The work of the R. C. is carried out by detachment members (men and women), V.A.D., associate members (those who support the society by giving part-time service other than as full detachment members), and the junior R. C., which was founded in 1915 and has two types: (a) Cadets: boys and girls between eleven years and school-leaving age, under the special charge of a cadet officer and attached to a senior dept.; (b) Links: formed in schools or juvenile organisations, between the age of five years and up to school-leaving. There is a special junior R. C. badge and a motto 'Serve One Another.' The objects of the junior R. C. are to keep themselves and others in good health, to give aid and comfort to sick and suffering; and to link together children of all countries in international friendship. A branch of

the B.R.C.S. exists in every co. throughout England and Wales. There are central council branches in Scotland, N. Ireland, and the Isle of Man. The national headquarters are at 14 Grosvenor Crescent, London, S.W.1.

The Brit. R. C. also has overseas branches in the colonies. The need for R. C. work is fully recognised in the Brit. Commonwealth, the most urgent being health education. Instruction in varied subjects is also carried out. Clinics, dispensaries, convalescent homes, and crèches have been estab. according to specific needs. Overseas branches are also undertaking pioneer work in lepro colonies, and in blood transfusion. The junior R. C. is active and is enthusiastically pursued. See H. St. George Saunders, *The Red Cross and the White*, 1949.

The Amer. National R. C. operates under a charter of the U.S. Congress, granted Jan. 5, 1905, and amended in 1947, to furnish volunteer aid to the sick and wounded of the armed forces in time of war, to act as a link between the people of the U.S.A. and their armed forces, and to carry on a programme of national or international relief when natural disaster strikes. The governing body of the organisation is a fifty-member board of governors, eight members of which are appointed by the President of the U.S.A.; thirty are elected by R. C. chapters, and the remaining twelve by their fellow board members. The President of the U.S.A. is honorary chairman of the organisation. National headquarters are in Washington, dist. of Columbia, and there are 3745 chapters in communities throughout the U.S.A. and insular terrs. The accounts of the Amer. R. C. are audited by the dept. of the army and the organisation's ann. report is submitted to the Congress. Membership in 1948 was 18,098,000 adults, with 19,314,427 enrolled in the Amer. junior R. C. In addition to its services to the armed forces and veterans, which cost the organisation \$35,352,300 in the 1948-1949 fiscal year, and disaster relief, which cost \$7,869,400 in the same period, the Amer. R. C. also carries on a large variety of health and safety services, including a national blood programme inaugurated in 1948.

Red Cross, The Royal, decoration for nurses instituted by Queen Victoria in 1883. It consists of a crimson enamel cross, gilt-edged, fastened by a bow of dark blue ribbon, red-edged, of width 1 in. It is conferred on nurses or other persons, either Brit. or foreign, recommended by the secretary of state for war on account of services in nursing and providing for sick and wounded soldiers or sailors.

Red Currant, see CURRANT.

Red Deer, city of Alberta, Canada, 90 m. N. of Calgary, on the Canadian Pacific Railway and the Canadian National Railway, in the valley of the R. D. R. There are large numbers of beef cattle in the dist., where dairying, hog-raising, and the cultivation of wheat, oats, and barley are carried on. Coal is mined, there are lumber mills and condensed milk works,

and creosote is made. Pop. 6700. See *Annie Jaetz, The Park Lands*, 1917.

Red Deer, or *Cervus elaphus*, large deer widely distributed throughout Europe, Asia, and N. Africa. It is a native of Britain, occurring still in the Scottish Highlands and the W. of England, while it is preserved in a number of parks. A full-grown male (stag or hart) stands 4 ft. high at the withers, and typical antlers measure about 32 in. in length and 32 in. greatest width. When fully developed they have brow, bay, and tray tines. Remains of R. D. which have been dug up in Brit. peat beds show that they were much larger and the antlers finer than is now the case. This is due partly to lack of sufficient food, and to the injudicious practice of shooting the best animals, leaving inferior ones to perpetuate the race. The antlers are shed in April or May, and a few days afterwards the new growth shows. While the new antlers are developing they are covered with a thick velvet, and while in this condition are very sensitive. They are full grown in about twelve weeks, and the 'velvet' is then rubbed off. It is well known that cast horns are chewed and eaten by deer. Hornless stags sometimes occur. During the breeding season the colour is a rich brown, turning grey at the approach of winter. The young are spotted with white.

The hangul or Kashmiri R. D. is known to sportsmen as 'barsingh.' The prin. differences between this R. D. and others of their tribe is the possession of a yellow rump patch and the fact that the 'bez-tine' (secondary antler point) on each horn is bigger than the brow; also the R. D. is larger than his Brit. relative and equal to the deer of E. Europe, Asia Minor, and the Caucasus. The stag stands at about 52 in. at the shoulder. It sheds its horns in spring and begins growing them again so rapidly that by late May they have hardly more than 2 in. to add to the beam. Ten points is a normal number, and a good head should be over 40 in. from the burr to the tip of the largest tine. In a fight between a stag with hinds and another stag, the two fight furiously with heads low and horns locked, each trying to throw the other to one side downhill. The finest stags never quit the forest, 'calling' infrequently, and living with a single hind or a succession of them. Unfortunately, with the relaxation of all forms of game preservation in Kashmir, the R. D. will be the first of the hill game to be shot down, especially as their venison commands a high price in Srinagar.

Redditch, tn. of Worcestershire, England, 16 m. S. of Birmingham. Its chief manufs. are needles and fishing tackle and motor cars. Pop. 21,100.

Redemptionists, see TRINITARIANS.

Redemptorists, or *Liguorians*, congregation of missionary priests founded in 1732 by St. Alphonsus of Liguori. It spread rapidly through Europe, especially after the suppression of the Jesuit Society in 1773. It was founded especially for work in country dists.

Redesdale, John Freeman Mitford, first

Baron (1718-1830), Eng. lawyer, b. in Holborn, London, son of John Mitford. Called to Bar, 1777, in 1780 he pub. a famous treatise on chancery practice. He was successively M.P., Beer-Alston, 1788; a Welsh judge, 1789; solicitor-general and knight, 1794; attorney-general; M.P. for E. Looe, 1799; Speaker of the House of Commons, 1801; lord chancellor of Ireland and a peer, 1802-6. He opposed Catholic emancipation.

Red Eye, see RUND.

Redfern, suburb of Sydney, New S. Wales, Australia. Its chief industries are the manuf. of boots and tobacco; it has also railway works and iron works. Pop. 20,000.

Red-headed Poker, see POCHARD.

Red Indian Languages, see under NORTH AMERICAN NATIVE LANGUAGES.

Red Indians, see AMERICAN INDIANS.

Red Irish Setter, see under SETTER.

Redlands, city in San Bernardino co., California, U.S.A., 6 m. S.E. of San Bernardino. It is engaged chiefly in fruit-growing and canning. Pop. 14,300.

Red Lead, see under LEAD.

Red-letter Days, greater festivals of the Church's year, which in the old MSS. or early printed eccles. calendars were written in red. The 'feasts to be observed' in the Church of England are R. D. The term has hence come to signify a very lucky day. See BLACK-LETTER DAYS.

Redmond, John Edward (1856-1918), Irish statesman and leader of the Irish Nationalist party. Of an Anglo-Norman family, long settled in Wexford, R. was b. at Ballytrent in that co., son of Wm. Archer R., M.P., a follower of Isaac Butt. Educated at Clongowes and Trinity College, Dublin, he entered the civil service, and was clerk in the Vote Office of the House of Commons. R. was elected as Nationalist member for New Ross, 1881; sat for N. Wexford, 1885-91. He was called to the Bar in England, 1886, and in Ireland, 1887. In 1891 he became M.P. for Waterford. He was Irish parl. whip at the time of the split in the Nationalist party after the Parnell-O'Shea divorce case, and remained with the Parnellite minority, in 1891 becoming their recognised leader. At the reconciliation in 1900 he was chosen chairman of the United party. In July 1914 he and John Dillon took part in the abortive conference at Buckingham Palace. He supported the Brit. Gov. when the First World War broke out, but the real Irish movement was now Sinn Féin, and the assurance it honestly gave to Birrell, chief secretary for Ireland, were (to some extent in consequence of the attitude of the War Office towards Irish volunteers) falsified by the Dublin revolt of Easter 1916, which took it by surprise. An agreement then made with Asquith and Lloyd George to bring Home Rule into instant operation with exclusion of the six N.E. cos. was repudiated by other members of the Cabinet, and R.'s prestige in Ireland sank. In the All-Ireland Convention of June 1917 his policy of acceptance of terms then offered was outvoted by the more thoroughgoing Nationalists

under Devlin. As a delegate from the convention, he went to London, Feb. 1918, but was immediately taken ill, and died March 6. His son, W. A. R., sat in the House of Commons for E. Tyrone, 1910-18, and for Waterford, 1918-22, and represented Waterford in Dail Eireann (1931). R.'s *Speeches* were pub. 1900. See also SINN FEIN. See S. Gwynn, *John Redmond's Last Years*, 1911; and lives by W. B. Wells, 1919, and D. Gwynn, 1932.

Red Oak, co. seat of Montgomery co., Iowa, U.S.A., 10 m. W.S.W. of Des Moines. Its chief manufs. are bricks and pottery. Pop. 5800.

Redon, tn. in the dept. Ille-et-Vilaine, France, on the R. Vilaine. In 820 a Benedictine abbey was founded, and was for long famous. R. has slate quarries, and manufs. machines. Pop. 6700.

Redonda, is. of the Lesser Antilles, Brit. W. Indies, N.W. of Montserrat.

Redoubt, name applied to military works entirely enclosed by earthworks. They were used principally for the purpose of resisting infantry attacks, and were seldom used as defensive works, since they offered so simple a target to the opposing artillery. They usually had a parapet of from 3 ft. to 6 ft. in height, deep trenches in the rear and specially constructed shelter pits. A R. could be easily constructed in less than 24 hrs., and would have a garrison of two to four companies of infantry. They were commonly used as supports for the second line of defence, or in order to keep the line of communication open. The word is still current in military parlance, but only metaphorically, e.g. 'Alpine R.' where certain elements of the tier. high command intended to hold out in 1945.

Redpoll, or **Redpole** (*Linola rufescens*), smallest Brit. finch, characterised by the deep crimson crown of the head and vermillion breast. It is gregarious, and migrates to Britain in the autumn.

Red Poll Breed, see under CATTLE.

Red River, important W. trib. of the Mississippi, takes its rise in Staked Plateau, Texas, passing through a famous canyon, 100 m. long and 1000 ft. deep. It later forms the boundary between the states of Oklahoma and Texas, then flows through Arkansas and Louisiana, and enters the Mississippi about 300 m. above the gulf of Mexico. It forms, during its lower course, numerous lakes and bays which abound in fine fresh-water fish; it takes a curious winding course, and has a length of 1550 m., of which 1200 m. are navigable. It is called after the colour of the water, which is in some parts of a reddish shade owing to a sediment which forms in the basin of the riv.

Red River (China), see SONG-KOI.

Red River of the North. This riv. flows through the U.S.A. and Canada. It forms the boundary between Minnesota and N. Dakota, and has as tribs. the Goose, the Sheyenne, the Wild Rice, the Marsh, and the Red Lake Rs. Its total length is 660 m., of which 520 are in the U.S.A. At first it flows S.W., then makes a great curve, joining the Bois de Sioux R. It then joins the Assiniboine near Winnipeg,

and empties itself into that lake. The plain it traverses was once Lake Agassiz, and is now a fertile agric. dist. (see under MANITOBA).

Red River Settlement. This famous settlement is now part of the prov. of Manitoba. The settlement originated in a migration scheme planned by a young Scots nobleman, the earl of Selkirk (see SELKIRK, THOMAS DOUGLAS, fifth EARL OF) to help clansmen who were living in the Highlands in poverty and without land. He began by sending 800 men to Prince Edward Is. but, conceiving more ambitious dreams, he turned to the valley of the Red R. with the idea of starting a settlement in the heart of the fur-trading empire. He bought shares in the Hudson's Bay Company in 1811 and received from the company a grant of 116,000 sq. m. of land, covering parts of what to-day constitute Manitoba, N. Dakota, and Minnesota. In the same year Selkirk's first party sailed to Hudson Bay under the command of Miles Macdonell, a Glengarry highlander, and selected for the headquarters of their colony a spot which now lies within the modern city of Winnipeg, and named it Point Douglas in honour of Selkirk. Selkirk's grant of land, however, lay directly across the N.W. Company's (see under HUDSON'S BAY COMPANY for the hist. of the rivalry between the two fur-trading companies) main highway to the far W., and was, in effect, a gesture of defiance. The crisis came in 1814 when Governor Macdonell issued an order forbidding the exportation of pemmican from Selkirk's ter., claiming that it was needed for food. The Métis, or half-breeds, whose livelihood depended chiefly on making pemmican for the fur trade, and the N.W. Company construed this as a declaration of war, and in the ensuing two years the colony was twice destroyed. In 1815 crops were trampled down, houses burned, and Macdonell and most of his settlers were transported to the N.W. Company's headquarters at Fort William and to Upper Canada. In the same year more settlers arrived through Hudson Bay under Governor Semple, but he and a score of his men were massacred by the half-breeds at Seven Oaks (close to Winnipeg's Main Street). At this point, however, Selkirk had started out from Montreal with 100 Swiss soldiers of the De Meuron regiment, which had just been disbanded after serving in the war of 1812. With their help Selkirk seized the N.W. Company's headquarters at Fort William, and planted his colony for the third time. In 1817 he signed the first treaty in the N.W. for obtaining land from the Indians, the latter giving up their claim to a strip of land along the Red and Assiniboine Rs. In this period Selkirk did much to establish the settlement, planning roads and bridges, setting aside sites for schools and churches, and seems even to have entertained the idea of an experimental farm. After leaving the col. ny, however, he became involved in lawsuits on account of the seizure of Fort William, and died a broken man, having spent over \$500,000 and sacrificed his life in the struggle to establish

a permanent settlement; but at least he had laid the foundations of the eventual colonisation of W. Canada, and to-day his name is honoured among the founders of the prairie provs. The union of the rival fur-trading companies in 1821 brought peace, but for some years longer the pioneer settlers faced grim hardships from storm, floods, and frost. They persisted in the face of all difficulties, climatic and economic, and, by 1826, numbered about 1500 in all, including some Métis farmers. But they could buy or sell next to nothing in those days as the Hudson Bay route was too costly for anything but the fur trade, and wheat, even though the best in the world was to be grown in the prairie, could not be sold until the advent of the railway. For over fifty years the buffalo herds were a mainstay of the colony, for the animals supplied meat for settlers and fur traders, while buffalo robes were sold in great quantities in the U.S.A. See G. W. Brown, *Building the Canadian Nation*, 1942.

Redruth, tn. of Cornwall, England, 9 m. S.W. of Truro. This tn. lies in the centre of the mining dist. of Cornwall, and its trade is connected with the tin- and copper-mining industries; there is a school of mines near by. Near the tn. are Carn Brea, a hill with Druidical remains and castle ruins, and Gwennap Pit, where John Wesley preached. Pop. 11,000.

Red Sea, or **Arabian Gulf**, branch of the Indian Ocean, running N.N.W. from the gulf of Aden for about 1200 m., extending from 12° 40' to 30° N. lat. It has Arabia on the E.; Abyssinia, Nubia, and Egypt on the W.; and is connected with the Mediterranean on the N. by the Gulf Canal, where it divides into two branches or gulfs, those of Suez and Akaba. The prin. harbours are: on the Arabian coast, Jiddah (the port of Mecca), Hodeida, and Mocha; on the African coast, Suez, Kosseir, Suakin, and Massowa. The atmosphere is extremely hot in the warm season, and the winds which vary the current are alone responsible for the slight tidal phenomena. After the opening of the Suez Canal in 1869, which connected the R. S. with the Mediterranean, trade in European vessels increased.

Red Setter, see **SETTER**.

Redshank, see **SANDPiper**.

Red Spider (*Tetranychus telarius*), tiny reddish succorial mite, not a true spider, which causes much damage to plants, especially those in dry greenhouses, by sucking the sap from the leaves, causing them to become yellow and die. It is prevented by keeping the atmosphere moist, and is killed by fumigating the structure with n'cotine or cyanide of potassium. Infested leaves can be cleaned by sponging with soft soap and water.

Redstart (*Ruticilla*), genus of warblers. The common R. (*R. phoeniceus*) is a summer visitor to Britain, nesting in hollow trees, where it lays about six greenish-blue eggs with red spots. Its upper parts are dark grey and the forehead pure white, the throat is black and the under parts rust red. The black-capped R. (*R. titys*) also visits Britain.

Its upper parts are deep bluish grey and under parts black. See J. Burton, *The Redstart*, 1950.

Reducing Agent, in chem., a substance which takes away oxygen; or, more generally, a substance which abstracts electro-negative elements or groups, as oxygen, sulphur, chlorine, bromine, iodine, and fluorine. Reduction is aimed at in the smelting of ores which contain oxides. If, for example, powdered litharge (lead oxide) be mixed with charcoal in the proportion of 10 to 1, and the mixture be heated in a crucible, the oxygen of the litharge will combine with the carbon to form carbon dioxide, leaving metallic lead. Carbon is in this instance the R. A., as it has abstracted the oxygen from the oxide. The chief R. As. are hydrogen, carbon, potassium, sodium, aluminium, magnesium, hydrides of iodine, sulphur, phosphorus, etc. A R. A. of wide application in organic chem. is hydrogen in the presence of finely divided nickel, the latter acting as a catalyst (q.v.). In commercial chem. this process is used in converting inedible oils (e.g. cotton-seed oil) into edible fats suitable for use as artificial lard and as constituents of margarine.

Reductio ad Absurdum, in formal logic, an indirect demonstration founded upon the impossibility of a contradictory supposition. Euclid constantly employed this mode of indirect reduction to the proof of his geometrical propositions. The process first supposes the conclusion of a syllogism to be false, and its contradictory true, and then constructs a new syllogism leading to a conclusion contradictory of one of the original premises. Most logicians now condemn this and analogous processes on the ground that in strict logic it is absurd to question the truth of one's own premises, inasmuch as the very purpose of all argument or syllogism is to deduce a conclusion which will be true when the premises are true, not when they are false.

Reduction. In Scots law the appropriate action for setting aside a document or writing is one of simple R., or, if actual forgery is alleged, of R.-improbatum. The usual grounds are that the grantor was a minor, inhibited (see **INHIBITION**), interdicted (see **INTERDICT**), deceived, or otherwise improperly drawn into granting it, or that the requisite solemnities were not performed, or that it was granted in prejudice of the rights of creditors. The rights of innocent third parties are generally safeguarded by the court.

Redwald, king of the E. Angles, reigned in the early seventh century. All that is known of him is through notices in Bede and Nennius and other chronicles collated by Palgrave, Skene, and others. He is chiefly notable for having defeated and slain Ethelfrid (q.v.), king of Northumbria, in A.D. 617, at a battle on the Idle R., and thereby restored to his throne Edwin (616-633), son of Ælla of Deira.

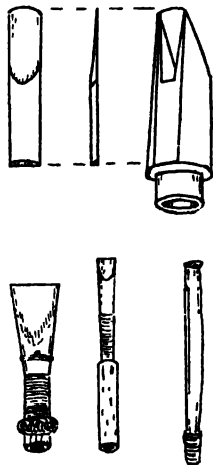
Red Wing, co. seat of Goodhue co., Minnesota, U.S.A., 41 m. S.E. of St. Paul. The chief manufs. are stoneware, boats, flour, and furniture. Pop. (1930) 10,000.

Redwing (*Turdus iliacus*), thrush some-

what smaller than the song thrush and with an inferior song. Its back is darker than that of the common thrush; the feathers beneath the wings are a bright rust colour, and there is a distinct white line over the eye. It is a winter visitor to Britain.

Redwood, see SEQUOIA.

Reed, John (1887-1920), Amer. journalist b. in Portland, Oregon, U.S.A., of wealthy parents. Educated at Harvard and travelled in Europe. He worked for the *American Magazine* and *The Masses*, and covered the Mexican revolt of 1914 for the *New York World*, accompanying 'Pancho' Villa (see VILLA, FRANCISCO),



REEDS

Above, two views of clarinet reeds and a clarinet mouthpiece; below, bassoon, oboe, and bagpipe.

and wrote his impressions of Villa and others in *Insurgent Mexico* (1914). In the First World War he was on the E. European front and was in Russia during the October Revolution, becoming associated with Lenin. His first-hand description of the Russian Revolution was contained in *Red Russia* (1919). Driven out of the National Socialist Convention (U.S.A.) in the same year, he organised the Communist Labor Party and founded and ed. its organ, the *Voice of Labor*. Being indicted for sedition, he took refuge in Russia, where he joined the Communist leaders. He died of typhus and was buried in the Kremlin. His most important work was *Ten Days that Shook the World* (1919), a graphic account of the revolution to which Lenin wrote an introduction for a later ed. Other pubs.: *Songar* (in *Poetry*) (1912); *The Day in Bohemia* (1913); *The War in Eastern Europe* (with Boardman Robinson, 1916). See life by Granville Hicks.

Reed, name of various tall aquatic

grasses. The common R. (*Phragmites communis*), formerly regarded as a species of *Arundo*, but now separated from that genus, is a tall plant, with long leaves or grass, a dense, drooping, purple-brown panicle of spikelets, and a perennial root. It is found exclusively in places overflowed even during summer. In such situations it occurs all through Europe, and is common in Siberia, Japan, and N. America, forming thick coverts, and yielding an abundance of stout durable grass of great value for thatching, while its long creeping rootstock binds muddy riv. banks. The plant is remarkable in that its ash contains over 70 per cent of silica.

Reed Bird, see BOBOLINK.

Reedbuck, see ANTILOPE.

Reeds: 1. The vibrating tongues producing the tone of certain woodwind instruments (except, for example, flutes) and of organ pipes, though in the latter case they are often made of other materials than reed. These instruments use so-called 'beating R.' and these are single for clarinets, saxophones, and organ pipes and double for oboes, bassoons, and bagpipes. There are also 'free R.' used in harmoniums and instruments of the concertina and mouth-organ type. 2. In weaving, frames of parallel flat strips of wood for separating the warp threads.

Reed Warbler, see WARBLERS.

Reefing, operation of reducing the area which the sail of a ship presents to the wind. From the head of a sail to the first reef-band, a piece of canvas sewed across a sail to strengthen it in the part where the eyelet-holes come, is called the first reef; from the first to the second reef-band is the second reef, and so on. Courses and top-sails are made reducible, the former generally having two, the latter four reefs. They are fitted with spilling, slat, and reef-lines and becket, and toggles on the yard. Reef-points or reef-linos are flat pieces of cordage tapering towards each end, and passed through the holes in the reef-band of a sail, a knot being then made on each side. Patent R. gear is sometimes used, which allows as much as possible of the operation of R. to be done from the deck.

Reel, Scottish, Irish, and Scandinavian dance, either of Celtic or Scandinavian origin. It is performed with the dancers standing face to face and the music is in quick 2-4 or 4-4, occasionally 6-8, time and divided into regular eight-bar phrases. A musical characteristic of many Rs. is a drop into the triad of the subdominant unprepared by modulation.

Reeling, see under CORVO.

Ree, Lough, lake in the R. Shannon, Eire, forming a boundary between Co. Roscommon and, cos. Westmeath and Longford. It is 17 m. long.

Reeve (O.E. *gerefa*), Eng. official who in early times was the chief magistrate of a tn. or dist., with the administration of which he was entrusted. There were many kinds of R., as the port R., the tn. R., the high R., the manor R., the shire R. ('sheriff'), etc. The word is now used in Canada for the president of a tn. council.

Reeve, see RUFF.

Referees, Court of, 'court' estab. in 1864, consisting of the chairman of ways and means, the deputy-chairman, and not fewer than seven other members of the House of Commons, whose duty it is to adjudicate on the preliminary question of the right of petitioners against private bills or provisional orders (*q.v.*) to be heard upon their petitions where an objection has been lodged against their *locus standi*.

Referendum. In politics a direct appeal by the gov. to the electorate on a single definite issue. Brit. political opinion is as much against the idea of a R. as it is against that of the initiative, the general theory of Eng. democracy or the principle of representation being that the parl. representatives are chosen not so much upon any definite issue or issues as upon a general policy the execution of which in detail is to be left to the representatives themselves (*see*, in reference to the mandate theory, *INITIATIVE*). Lord Balfour of Burleigh introduced a Bill into the House of Lords in 1911 for establishing the R. This was merely a belated effort at reform of the House of Lords made in the vain hope of defeating the Parliament Act, 1911 (*q.v.*).

The general principle of the R. as it is understood in many of the states of the U.S.A. is that no law or measure save those whose urgency is required by public safety, and which, as a rule, require a two-thirds or three-fourths majority, shall go into effect for a fixed period (say ninety days). If during this period 10 or more per cent of the people sign a petition for a R. on that law, it would not go into effect until the next election, when the whole people would vote on it. If rejected it would cease to be a law. Different states have, however, somewhat differing rules. There is, however, no provision for the R. in the Federal constitution of the U.S.A. In Switzerland the R. applies only to legislation affecting the constitution which has already passed the Federal Assembly by a specified majority. The more recent (pre-1939) constitutions in Europe made provision for the use of the R. The present (1937) Irish constitution provides that no amendment of the constitution can be effected except with the approval of the people given at a R. Also the president of Eire can, at the instance of a prescribed proportion of the members of the Parliament, refer certain Bills to the people for decision at a R. By the Ger. constitution of 1919 the president had the right to make use of the R. at his discretion.

Canada has used the R. particularly on the question of the liquor laws. Australia has used the R. on sev. occasions to introduce amendments to the constitution, and proposed laws for altering the constitution must be submitted to the electors and can be enacted only if approved not only by a majority of the states but also by a majority of all the electors voting.

Reflection and Refraction of Light. In travelling through space or any homogeneous medium the waves of light pursue a straight path; on reaching another

medium part of the energy is transmuted, i.e. part of the light is lost, the remainder being either thrown off as reflected light or penetrating and passing through the new medium. That the incident and reflected ray are in the same plane with the normal or vertical line at the point of reflection is

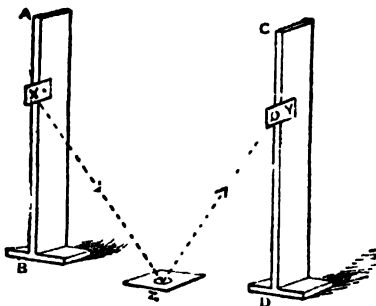


FIG. 1

proved by a simple experiment as in Fig. 1, where the reflection of X in the mirror Z is viewed through a small hole in Y. Further, on altering the position of the mirror and adjusting Y so that the image of X appears through the hole, it will be found that XH/XZ is always equal to

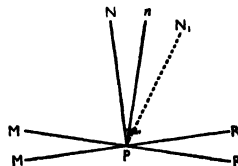


FIG. 2

YD/YZ ; i.e. the angle of incidence equals the angle of reflection. These two laws being entirely mathematical, the study of reflection becomes a branch of geometrical optics. Fig. 2 illustrates a simple development. N is the normal to the mirror MR, and an object at N will be reflected

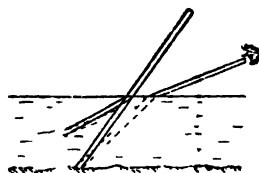


FIG. 3

back upon itself; if now the mirror be rotated on P into the new position M_1R_1 , the normal will be n_1p and the reflection of N will appear at N_1 , that is, the reflected ray rotates at twice the speed of the mirror. The phenomenon of refraction is readily observed by immersing a piece of stick in water, as shown in Fig. 3, when

the eye is placed in the same plane as the stick. By arranging an experiment as shown in Fig. 4, where a strong beam of light is reflected by the prism P on to the milky water in the tank, and marking the angle of incidence and the angle of refraction (i.e. the angles made by the two bent portions of the beam with the normal) with strips of paper on the side of the tank, it can be shown that whatever the angle of the incident beam, it always bears a constant ratio to its angle of refraction. Denoting this ratio by its usual symbol μ , then $\mu = \sin \phi / \sin \theta$, and this is the index of refraction from the first to the second medium; for air and glass, $\mu = 3/2$; for air and water, $4/3$. The refractive index of a substance is the ratio, when the incident beam enters from a vacuum; for air, glass, and water the figures are 1.00029, 1.5, 1.34 respectively. This law, together with the law that the path of the bent beam and the normal are in the same plane, again gives the mathematical basis of the further

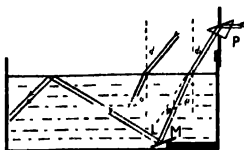


FIG. 4

study. In Fig. 4 the angle ψ is the deviation of the light. If in the same figure the light originated in the water at L, it would traverse the same path, but in the opposite direction; then, light travelling from a less (optically) dense to a denser medium is bent towards the normal; from dense to less dense, away from the normal. In this latter case there is an important consequence. The mirror M in Fig. 4 may be moved to reflect the light falling on it; as the beam emerges from the water it is bent towards the left. As now the beam is reflected more and more to the left in the water, the emergent beam will fall closer and closer towards the surface. A point is reached when it coincides with the surface. Beyond this refraction ceases and total reflection takes place, as shown in the figure, i.e. the beam enters the water and obeys the law of reflection. This is readily observed by holding a glass of water above the eye, when the upper surface appears as a mirror. The angle of incidence at the moment when the emergent ray disappears is known as the critical angle; it is easily calculated to be $\sin^{-1} 1/\mu$. For water to air it is $48^\circ 45'$. Newton discovered that the refractive index of a substance varies for the different coloured constituents of white light (see DISPERSION; SPECTRUM).

Double Refraction.—On looking through a crystal of Iceland spar, there is a position when an object looks double. This is due to a second refracted ray, called the extraordinary ray, which does not lie in the plane of the incident ray (see POLARISATION). The phenomena of reflection and refraction give rise to such occurrences as

the mirage, rainbow, haloes, etc. Refraction is of extreme importance in astronomy, since the rays from heavenly bodies are refracted on entering the atmosphere. The twinkling of stars is due to refraction varying with the varying density of the air pierced by the ray. See T. Preston, *Theory of Light*, 1895, 1928; R. A. Houston, *A Treatise on Light*, 1927; W. H. Bragg, *Universe of Light*, 1933; R. G. Mitton, *Heat, Light, and Sound*, 1936; and R. W. Stewart and J. Satterby, *Text-book of Light*, 1941.

For refraction, in vision, see REFRACTION, ERRORS OF.

Reflex Action, see NERVOUS SYSTEM.

Reform, Political and Social. Political historians generally appropriate this term exclusively to one kind (albeit far-reaching in its results) of R. only, that of the franchise, which, gradually extended to the different classes of an overgrowing urb. pop., socially reformative legislation, with recurring periods of neglect, became a regular feature of political propaganda. The year 1906 saw a reversal of the electoral tide in favour of the Liberal party, which party had for long identified itself with schemes of social R. (see LIBERALISM). Much in the way of the amelioration of the conditions of life of the masses has been done during the last three or four decades. The Liberal govs. of 1906-14 had a long list of ameliorative social legislation to their credit. The years 1914-18 were naturally barren of legislation affecting the social conditions of the people. Legislation not immediately bearing on the prosecution of the war was postponed to a more convenient period. There is, however, an important statute of 1918, namely, the Representation of the People Act, 1918, which conferred the franchise on all men of full age, and on women who had attained the age of thirty, and married women. Ten years later another Act, entitled the Representation of the People (Equal Franchise) Act, 1928, was passed by the Baldwin Gov. It extended the franchise to men and women of full age on equal terms. Thus it may be said that the great political fights of the nineteenth century, having for their end the extension of the parl. franchise, culminated in the Act of 1928, passed by a Tory gov. and popularly known as the 'Flapper Vote Act,' which gave adult suffrage. It may be that future historians will look upon the nineteenth century politically as the century of the struggle for the vote. The rise to prominence and power of the Socialist party in Britain, a rise unparalleled in hist. for its rapidity, has already exercised a strong influence on the progress of social reform. See also SOCIAL SERVICE.

Reformation, name generally given to the great religious revolution which took place in the W. Church in the first half of the sixteenth century, and by which almost all the N. part of Europe threw off the supremacy of the bishop of Rome.

Causes.—The statement that it is impossible to study any period of hist. apart from the periods that precede and follow it, though true at all times, is especially

true of the period of the R. The roots of the movement are to be sought centuries before the outburst occurred. Its effects are with us now. The chief of these will be summed up at the end of this article; we are now concerned with the steps by which the discontent with the papal system gradually led to open revolt. To do this properly it would be necessary to give a full account of the social, political, and intellectual state of Europe during the fourteenth and fifteenth centuries. One point must be emphasised, the medieval polity was essentially centralising. Previous to the R. the see of Rome claimed by divine right and asserted (with the assistance of the lay power of the various states of Europe) an absolute authority over the whole Christian Church in all matters both spiritual and temporal. Though the exercise of this power in the temporal sphere, especially in matters of papal taxation, was resisted by various princes, it was freely taught that as the vicar of Christ, responsible to God alone, the pope had power to give and take away kingdoms. Again, since the clergy were the educated class of the Middle Ages, and since under feudalism they had been entrusted with the gov. of large areas in every country, it was inevitable that a preoccupation with secular affairs and a consequent worldly spirit should arise amongst them. To worldliness must be added two abuses of administration: that proceeding from the system of pluralities, by which many benefices and livings might be accumulated in the hands of one man, and that by which youths and even children were raised to the high offices of the Church. There was also much laxity in the lives of the clergy and prelates, laxity which was increased by the Renaissance movement.

The Renaissance contributed more directly in another way to cause the R. It was the outburst of individualism, and caused a growth of national consciousness in all the countries of Europe. Its seeds took root more firmly among the N. races, for the Teutons have ever stood for individualism in opposition to the unifying tendency of the Lat. races. The critical Renaissance attitude, coupled with the general spirit of anti-clericalism, led to a questioning of the doctrinal bases on which the unpopular vested interest of the clergy ultimately rested. Thus we find that Luther's protest, from being at first a voicing of the widespread feeling against clerical rapacity, as exemplified by the preaching of the indulgence of 1517, passed quickly to an attack on the doctrine of indulgences, and thence to a general attack on the doctrinal system of the Church. Finally, the greed of laymen played some part in the general overthrow of the Catholic system in N. Europe. The chance of enriching themselves at the expense of the Church tempted kings and nobles to throw in their lot with the reformers and thus to supply that condition of governmental support without which, in that age of centralised despotism, the movement from below would not have succeeded.

The Objects and Teaching of the Reformers.—As a general rule the R. succeeded in those countries where the civil gov. and the reformers acted in combination. The main object of both was the same, viz. the overthrow of the papal supremacy and the curtailment of clerical privileges. But, whereas civil govts. promoted this policy for their own aggrandisement, the reformers proper were actuated by religious zeal. The overthrow of the hierarchy was a necessary step to doctrinal changes, changes which they regarded as a revival of primitive Christianity. In the whole of the literature issued by the reformers we find this last point strongly emphasised: that the main body of the Church had fallen away from the primitive truth and the primitive discipline, that already appeals had been going up too long for a general council to reform the manifold abuses, and that it was therefore necessary that all those who could should set about the task of R. immediately. The appeal of the reformers, especially in England, was to the Bible and the Fathers. They disclaimed any desire to introduce new doctrine, and charged the Catholics with the introduction of novelties.

The Reformation in Germany.—It was one of these practical abuses that impelled Martin Luther to the act which has ever been considered the official beginning of the R. On Oct. 31, 1517, he nailed to the doors of the castle church of Wittenberg his famous theses in which he attacked the doctrine of indulgences. The move to doctrinal reform was rapid; and in 1519, in his disputation with Eck and Eckius, one of the ablest of the Catholic champions of that age, he questioned the supremacy of the pope and the doctrines of purgatory, auricular confession, and priestly absolution. In June 1520 Pope Leo X. issued a bull condemning as heretical forty-one propositions extracted from Luther's writings. Luther appealed from the pope to a general council, and publicly burnt the bull in Dec. In Jan. of the next year (1521) he was excommunicated. Three months later he appeared before the Diet of Worms to defend his opinions, and here he maintained that both popes and councils may err. He refused to retract his teachings, and placed himself under the protection of the Elector Frederick of Saxony, who steadily upheld the cause of the reformers. On his death in 1525 his successor John, openly embraced the R., and during the next four years, with the assistance of Melancthon in Saxony and Bucer at Strasburg, Luther's opinions spread rapidly throughout the Ger. states and even as far as Sweden. This rapid diffusion of the R. in Germany was helped, however, not only by the popular feeling, but also by the self-interest of the various princes, who eagerly seized upon the wealth of the suppressed convents, collegiate churches, and other eccles. establs., a selfish motive which no one deplored or censured more bitterly than Luther himself. In 1529, at the Diet of Speyer, the Rom. Catholic princes were in the majority and proscribed many of the reformers'

chief tenets. It was from the protest which the other princes and their adherents then made that the name Protestant (*q.v.*) is derived. Following on this protest an unsuccessful attempt was made to reconcile the Lutherans and Zwinglians. In 1531 the Confession of Augsburg was pub., giving the doctrine of the reformers. Meanwhile the emperor had issued an edict forbidding any further action by the reformers until a general council should have been called. Alarmed at his action, the Protestant princes assembled at Schmalkald, with the elector of Saxony at their head, to form a religious and political defence league. War followed, and in 1546, through the defection of Maurice of Saxony, the Schmalkaldic League was utterly defeated. In 1555, after prolonged negotiations, a diet met at Augsburg to settle the religious condition of the Ger. states, and it was decided that each prince should choose his side, that the people should follow him in religion, and that there should be no attempt at compulsory conversion on either side. The peace thus made was broken in 1619 by the Thirty Years war, terminated in 1648 by the peace of Westphalia, which estab. a more tolerant and workable arrangement, based on compulsory religious conformity within each state and religious equality between the states.

In Switzerland.—While Luther had been working in Germany, a parallel movement had been progressing in Switzerland under the leadership of Ulrich Zwingli. Here again the proximate cause of the outburst was the doctrine of indulgences, and here again political events conspired to regulate the course of the R. Though Zwingli preached against indulgences in 1518, it was long before the Rom. Curia took action, its attention being concentrated on Germany. In 1528 the council of Basle arranged an elaborate disputation, and this was followed by the pub. by the council of Bern of a series of ten theses agreed on by the reformers. In 1531 Zwingli was killed. Henceforward the centre of reform moves from Zurich to Geneva, and the hist. of the movement gathers round the name of Jean Calvin (for the further progress of the R. in Switzerland see CALVIN). But the influence of this great Fr. reformer did not stop here. His system of church polity formed the model for the Presbyterian and Congregational systems, and the influence of his theological teaching spread as wide as the R. itself. His influence was especially great in France, Holland, Scotland, and England.

In the Northern Kingdoms, Denmark, Norway, and Sweden.—In all these three countries the Lutheran form of the reformed religion spread rapidly, and in each case the action was initiated by the sovereign. In Sweden the Lutheran doctrines were accepted by Olaus Petri and Archdeacon Andersson. The work was then taken up by Gustavus Vasa, who found in the new movement a powerful tool for the furtherance of his own projects. In 1527, at a council held at Westerås, the reformed doctrines were

unanimously adopted. The work of R. was completed by the Synod of Orebro (1529); though externally the change in Sweden and Denmark was less than in the other countries, most of the externals of Catholic worship being retained. The new teachings were introduced into Denmark, then united to Norway, by Christian II. about 1520, and after his deposition in 1523 the work was carried on by his successor, Frederick. He granted religious liberty to the reformers at the Diet of Odensee in 1527, and in 1546, at the Diet of Copenhagen, the new doctrines were finally imposed on the country. Their introduction into Norway was due to Christian III., and here again many of the externals of Catholic worship were retained.

In France.—This country had always been a great stronghold of Catholicism, and the new doctrines have never made any considerable progress within its bounds. The reformed doctrines were embraced by the upper classes, whereas the peasants and lower classes rejected them with the greatest obstinacy. The new doctrines had found their way into France as early as 1530 from Germany and Switzerland. There was a tradition of religious dissidence among the mts. of Dauphiné, bordering on the Waldenses. Pierre Robert d'Olivet, Michel Cop, rector of the univ. of Paris, Beza, and others adopted and spread this, and Margaret of Navarre, sister of Francis I., gave them her countenance. But Francis I. opposed them, and used the stake and the faggot freely to extinguish them. The persecutions, the civil and religious wars, the truces and other vicissitudes of the Fr. Calvinists, during the reigns of Francis I., Henry II., Francis II., Charles IX., and Henry III., are part of the hist. of France (see FRANCE, *History*). At last Henry VI. by the Edict of Nantes (1598) acknowledged the reformed faith as the lawful creed of a part of the Fr. pop., the Huguenots (*q.v.*).

In the Netherlands.—The doctrines of the R. had made many converts in the Netherlands during Luther's lifetime, and a fresh influx of Calvinists from France and Switzerland increased the number of dissidents from the Rom. Church. The wild outbreaks of the Anabaptists at Leyden, Munster, and other places at first threw discredit on the principles of the R., but these disturbances were soon put down. The reformers suffered terrible persecutions under Charles V. of Spain, and matters were made worse under his successor, Philip. Hence came the revolt of the Low Countries, which ended in the N. states adopting Calvinism. The Netherlandish Confession of Faith was pub. in 1562, and was later revised and republished at the Synod of Dort in 1618. Since then a majority of the Dutch have remained permanently attached to Calvinism.

In East-Central Europe.—Under the sway of Sigismund Augustus, the Lutherans and Calvinists became very numerous in Poland, and many of the high nobility embraced the reformed doctrines. Their

numbers were greatly reduced by the persecutions under Sigismund II. and some of his successors; but they were never annihilated, and Lutherans and Calvinist congregations have continued to exist in most tns. of Poland. Even before the R. actually commenced, the exertions of John Huss and his followers had converted almost the whole of Bohemia into a hot-bed of religious unrest, and in this dist. the R. was received immediately. After the Thirty Years war, however, Protestantism was entirely rooted out. In Hungary and Transylvania the R. was spread by Hungarians who had studied at Wittenberg, and in spite of strict laws against them there were soon followers of Luther and Calvin throughout the country.

In England and Scotland.—Though the divorce of Henry VIII. from Catherine of Aragon must be described rather as the occasion than the cause of the break with Rome, nevertheless that episode is important because it enlisted the Crown on the anti-papal side, and without governmental support the R. movement could hardly have succeeded. Though Henry claimed for himself the headship of the Church, yet he had no sympathy with the reformed doctrines, and the famous Act of Six Articles brought many of the reformers to death at the very time when Catholics were dying in support of the principle of the papal supremacy. Under Edward VI., the gov. allied itself with the Protestant minority and drastic changes were seen. The latter part of this short reign is indeed the worst part of the Eng. R. The zeal of the reformers far outran their discretion, and their acts were characterised by reckless cruelty and wanton vandalism. The reign of Mary saw a temporary return to the Rom. obedience, but on the accession of her sister in 1558 the work of reform was resumed. The mass of the clergy conformed, the Catholic gentry were crippled by fines, and during the reign some 180 Catholics, mostly priests, were butchered. The reformed religion gradually permeated the Eng. people. In Scotland the name of John Knox stands out above all the rest, though here also impetus was given to the movement by political causes. The nobility espoused the R. because it provided a powerful weapon against the obnoxious sovereign. (For a further account of the progress of the R. in this country see KNOX, JOHN.)

Effects of the Reformation.—The Renaissance, the invention of printing, the discovery of America, and the R. changed the face of Europe and still condition the civilisation and outlook of the modern world. The result was a moral and intellectual revolution on so vast and complicated a scale that it is impossible to say that any particular development was an effect of one only of these four causes, such as the R. Any interpretation of the effects of the R. is coloured by religious prepossessions. A Catholic regards the R. as disastrous because it broke up the unity of Christendom. A Protestant regards it as the birth of freedom of thought, the inauguration of a purer

religion, and the point of departure for all modern progress. A neutral observer might point out to the Catholics that the R. reacted beneficially on the Catholic Church by giving impetus to the movement which culminated in the doctrinal classification and disciplinary spring-cleaning of the council of Trent, while on the other hand he might remind the Protestant that the number of rival sects into which Protestantism has split has led in our own day to a desire among the reformed Churches for religious reunion.

See G. Mentz, *Handschriften der Reformationszeit in Tabula in usum Scholarum* (ed. by J. Lietzmann), 1910; G. Wolf, *Quellenkunde der deutschen Reformationsgeschichte* (3 vols.), 1915-23; P. Smith, *Age of the Reformation*, 1920; H. Belloc, *How the Reformation Happened*, 1929, *History of England*, 1931, and *Characters of the Reformation*, 1936; H. S. Lucas, *The Renaissance and the Reformation*, 1934; E. C. Messenger, *The Reformation, the Mass, and the Priesthood: a Documented History with Special Reference to the Question of Anglican Orders* (vol. i., *The Revolt from the Medieval Church*, 1936; vol. II., *Rome and the Revolted Church*, 1937); J. Mackinnon, *The Origins of the Reformation*, 1939; and F. M. Powicke, *The Reformation in England*, 1911.

Reformatory and Industrial Schools. A reformatory school is defined in the unamended Children Act, 1908, as a school 'for the industrial training of youthful offenders, in which youthful offenders are lodged, clothed, and fed as well as taught.' An industrial school is there defined as a similar estab. for children as distinct from youthful offenders. Reformatories were intended for persons under sixteen convicted of an offence punishable by imprisonment, and who were either between fourteen and sixteen or, if between twelve and fourteen, had been previously convicted. Detention might be for a period of from three to five years, but must have expired before the offender reached the age of nineteen. An industrial school was rather an institution for the salvation of children apparently under fourteen who were so circumstanced that they might be said to be on the path of crime. But this nomenclature has now entirely disappeared under the Acts of 1932-33, the desired objects being achieved through the machinery of 'approved schools' (see further under CHILDREN ACTS, 1908-33). One radical defect of the old system always vitiated the reformatory properties of these schools: the fact that all sorts of youthful offenders were herded together without discrimination of mental capacity. The result was that a large proportion were in reality mental deficients, until the Mental Deficiency Act, 1913, to provide certified institutions for the feeble-minded. A further development has been the institution of classifying approved schools which, after a period for observation, determine which school is the most appropriate to the individual. Experience shows an increase in juvenile delinquency in wartime. Thus in the year 1916 there were 10,897

boys and 3052 girls in industrial schools, and 3698 boys and 532 girls in reformatory schools. In 1924 there were 3871 boys and 1177 girls in industrial schools, and 1952 boys and 138 girls in reformatory schools. In 1948 there were 9207 boys and 2105 girls in approved schools; these numbered 145 in England and Wales, 111 still run by voluntary managers and local authorities. All of them are inspected by the Children's Dept. of the Home Office, who must approve the appointment of the head. See also **BORSTAL SYSTEM**; **MENTAL DEFICIENCY ACTS**. See Sir E. Ruggles-Brise, *The English Prison System*, 1921; Winifred A. Elkin, *English Juvenile Courts*, 1938; and M. M. Simmons, *Making Citizens*, 1948.

Reform Club, founded in 1837 and formerly the headquarters of the Whig party. Cobden, Bright, Gladstone, and all the notable Whigs or Liberals (see **PARTY GOVERNMENT**) were members in their day. The club premises are at 104 Pall Mall, London. It has a fine library, the roof of which is supported by marble columns. There is no collection of political works in the United Kingdom comparable to that of the R. C. Since the decline in the fortunes of Liberalism the R. C. no longer enjoys its former political prestige, having been superseded by the National Liberal Club, though it is still frequented by professional men, particularly journalists, lawyers, and economists.

Reformed Churches, term conventionally used to designate those Protestant churches which followed the teaching and eccles. organisation of Calvin and Zwingli rather than those of Luther. In Germany the Reformed and Lutheran churches co-exist. Of the other Protestant churches, those of Scotland, Holland, France, Poland, Switzerland, and most of those in America belong to the former group. The R. C. differ from the Lutheran in their total rejection of consubstantiation. They consider the Lord's Supper as nothing but a commemorative meal. They also reject the ceremonial and ornaments retained by the Lutherans, such as, for example, the crucifix, and have generally a Presbyterian organisation.

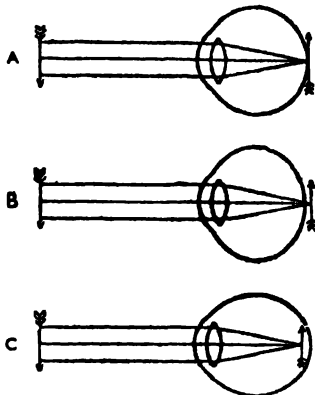
Reformed Presbyterians, see **CAMEROONIANS**.

Reform, Social, see **REFORM, POLITICAL AND SOCIAL**; **SOCIAL SERVICE**.

Refraction, see **REFLECTION AND REFRACTION OF LIGHT**.

Refraction, Errors of, in the case of vision, are due to constitutional or pathological abnormalities in the cornea, aqueous humour, crystalline lens, and vitreous humour, whereby the rays of light are abnormally refracted, or to muscular changes leading to deficient accommodation. Presbyopia (old sight) is due chiefly to loss of elasticity in the lens and contractile power of the ciliary muscles, with advancing age; near objects are indistinct. In hypermetropia (long sight) the eyeball is short and the focus of the rays lies behind the retina, producing a condition similar to presbyopia, but applying to objects at all distances; both are corrected by convex glasses. When the eyeball

is long so that the focus lies in front of the retina, Myopia or short-sightedness is found; distant objects are indistinct or near objects have to be brought too close to the eyes. Eye-strain with watering and headache often accompany myopia; concave glasses, by slightly diverging the rays before entering the eye, can be so chosen as to throw the focus on to the retina, producing correct vision. Astigmatism may be simple, compound, or mixed. It is due to the abnormal shape of the cornea or lens, whereby the rays of light in different planes are not refracted to the same focus. It exists in every degree of complexity, but is simple when one meridian has correct refraction but the other is myopic or hypermetropic;



A, NORMAL VISION; B, HYPERMETROPIA (LONG SIGHT); C, MYOPIA (SHORT SIGHT)

compound when both meridians show errors of the same kind but differing in degree; **mixed** when one gives myopic, the other hypermetropic vision. Cylindrical glasses, correcting the eyes' curvature, are used to correct astigmatism. Asthenopia is eye-fatigue, due to overstrain of the muscles of the eye, or to neuropathic condition, consequent on the various defects of refraction. Anisometropia is the condition found when one eye has a considerable difference in error of refraction from the other eye. Suspected eye defects should be investigated by an ophthalmic optician or ophthalmic medical practitioner in consultation with the patient's own doctor. In some cases spectacles may be prescribed for close work (reading, needlework, etc.), and in others constant use of spectacles will be found necessary.

Sight-testing is still the term used, mainly in everyday parlance, for describing eye examination. This is carried out by ophthalmic opticians and by ophthalmic medical practitioners and includes a detailed consideration of the patient's symptoms and hist. The external and internal parts of the eyes are examined carefully, its movements and reflexes observed, and the refraction of the eyes is

measured in order to detect any optical defects. In a straightforward case the procedure commences with a routine check on the health of the eyes by means of an ophthalmoscope (q.v.). The refraction of the eyes is then measured first by objective methods, which require no conscious assistance from the patient (retinoscopy). These results are then verified and possibly modified during a subjective examination in which the patient observes a series of graduated letters, and also answers questions about the relative clarity of groups of black lines (fans, squares, diamonds, etc.). All these tests together enable the practitioner to measure accurately the degrees of hypermetropia, myopia, astigmatism, presbyopia, that may be present. The patient's muscle balance, accommodation, and convergence are also considered, as these have an important bearing on visual comfort. Patients requiring more detailed examination may have their fields of vision measured and mapped for scotomata (blind areas), their colour vision tested, or further investigation of pupillary reflexes, ocular muscles, etc. Extended treatment known as orthoptics may be given to patients with muscle abnormalities or where the two eyes do not work together comfortably—e.g. children with a squint or a tendency to squint.

See W. S. Duke Elder, *The Practice of Refraction*, 1928; J. Thorington, *Refraction of the Human Eye*, 1930; Gibson, *Clinical Orthoptics*; H. Emsley, *Visual Optics*, 1939; and G. H. Giles, *The Practice of Orthoptics*, 1943.

Refrigerant, in medicine, an agent used for lowering the temp. or allaying thirst. The term is usually applied to those agents which give a feeling of coolness, the term *antipyretic* being reserved for remedies which actually lower the body temp. The most important antipyretics are cold, as in the wet pack, agents which produce perspiration, antipyrin, antifebrin, phenacetin, etc. Substances which afford relief to thirst without materially affecting body temp. are barley water, effervescent fruit drinks, potassium chlorate, potassium nitrate, etc.

Refrigeration, removal of heat from the substance which it is desired to cool, and its transference to a cooling medium, sometimes water, sometimes the atmosphere. R. depends on the two well-known facts that when a gas is compressed its temp. will rise, and that if its temp. is reduced whilst under this compression then the gas will liquefy. If the pressure is then reduced the liquid will boil (i.e. revert to gas), and in so doing draw heat from its surroundings. Only a restricted few gases may be used as refrigerants; those in most common use are ammonia, methyl chloride, sulphur dioxide, dichlorodifluoromethane (Freon 12), and monochlorodifluoromethane (Freon 22). Freon is almost the ideal refrigerant because it is neither poisonous nor explosive, has very little odour, is not inflammable, does not corrode metals, and condenses with only moderate pressure. The two prin. types

of refrigerators are the absorption type and the compressor type. The latter is in most common use, especially for industrial and marine purposes.

Absorption Refrigerator.—Ammonia is the refrigerant used in this type. A solution of ammonia and water is heated in a container and the ammonia gas driven off is condensed in an air or water-cooled condenser. The condense is then led into an evaporator where it boils or evaporates; therefore, as a liquid to boil must extract heat from its surroundings, refrigeration is achieved. The gases from this evaporating process are then dissolved in water and the liquid refrigerant flows back to its original container, the complete cycle being thus attained. The heater may be gas, electric, or even an oil-burner. There is thermostatic control on the heater. As there are no moving parts the obvious advantage lies in the fact that this type is completely silent; if the heater is electric it is suitable for either A.C. or D.C. use, and if a voltage is encountered different from that for which the refrigerator is constructed, then only the heating element has to be changed at a comparatively small cost. Hydrogen is introduced into the system to maintain a constant pressure throughout. In some plants a solid absorber is used in place of water, like silica gel or calcium chloride, but the principle remains the same.

Compressor Type. A compressor creates a low pressure on its suction side and a high pressure on its discharge side. The suction side is connected to an evaporator in which of course a low pressure is created. A liquid refrigerant in the evaporator boils because of this low pressure and so draws heat from its surroundings. The gas then passes through the compressor to the condenser, which in turn liquefies the gas which then passes on to the evaporator again. The compressor may be driven by electrical or mechanical means. An electric motor is usually thermostatically controlled from the evaporator, therefore if the temp. rises the motor will start and the compressor will reduce the pressure. The evaporator in a domestic refrigerator consists of coils, which are formed into a rectangle for the purpose of holding water trays. Water should be kept in the trays to assist refrigeration. Theoretically it is possible down to -458°F. , at which temp. all molecular motion stops. The thermostat usually used in domestic refrigerators is the bellows type (see THERMOSTATS). There is one other type of R. plant known as the cold-air machine, but this is now largely obsolete. See H. Williams, *Mechanical Refrigeration*, 1934.

Refuse, Disposal of. Public cleansing includes the collection of refuse from premises, the cleansing of streets and the disposal of refuse resulting therefrom. The degree of service rendered by the local authority varies considerably, depending on the nature of the locality and the types of refuse which the local authority has undertaken to collect. Under the Public Health Act, 1936, a local authority

may, and if required by the minister of health must, undertake the removal of house refuse and the cleansing of earth closets, privies, ashpits, and cesspools. Where local authorities have undertaken any such service, they are liable to penalty on failure to perform the service within seven days after notice by an occupier of premises. Where the local authority do not themselves render the services, they may require the occupier so to do. The local authority may require the owner or occupier of premises to provide approved dustbins, or else the authority may provide and maintain dustbins for which a charge of 2s. 6d. per annum per bin can be made. The local authority may undertake the removal of trade refuse and may make a reasonable charge for this service. A local authority may, and if required by the minister of health must, undertake the cleansing of streets in either the whole or any part of their dist. The above applies to authorities outside London. In London the metropolitan bors. and the common council of the city of London must remove house refuse and cleanse and empty ashpits, etc.

At one time household refuse was stored and collected in ashpits. Now dustbins are employed for both trade and domestic premises, and most refuse collection consists of the removal of the contents of dustbins by special refuse-collecting vehicles. There are sev. types of vehicle, most of which can be classed as either side-loading or back-loading. The type selected depends on the locality: side-loading vehicles are perhaps the most popular, but rear-loading vehicles are particularly advantageous in windy dists., for they reduce the amount of dust and paper which is blown off the load. Many of the latter type involve special compressing mechanisms, to ensure full loads, and means of tipping or otherwise discharging. Special vehicles are provided for dealing with the refuse from blocks of flats, e.g. vehicles which deliver empty refuse trucks and take away full trucks for the disposal of their contents. Street cleansing vehicles include watering-carts or lorries, sweeping mechanisms, gully-flushing tank vehicles, etc. For the emptying of cesspools and septic tanks, special cesspool-emptying vehicles are available. Some of these can also be used for the removal of night soil.

The cost of refuse disposal, which is usually an appreciable charge on the rates, depends partly upon the service rendered; but the keynote of refuse collection is efficient organisation. (Owing to the varied routes that have to be taken by vehicles, the planning of itineraries is of great importance; and because the amount of material to be removed varies seasonally, considerable thought has to be given to the labour problem, if overtime and waste of labour are to be avoided.)

Methods of disposal of refuse include tipping on land; dumping at sea; incineration (see DESTRUCTORS); conversion to fertiliser by composting with sewage sludge, or pulverisation and mixing with dried sludge; digestion either of the refuse

alone, or in combination with sewage sludge. By far the greater quantity of refuse is disposed by controlled tipping, i.e. tipping according to plan so as to avoid nuisance. Next are incineration and crude or uncontrolled tipping; other methods of disposal are rarely employed. At one time, when tips were not properly controlled and were very insanitary, incineration was considered greatly preferable to tipping. But in 1922 the Ministry of Health issued a 'list of precautionary measures for abating and preventing nuisances arising from refuse tips' which, with slight emendation, was reproduced in the ministry's report for 1931-32. This had the effect of making 'controlled tips' generally popular. In brief, the rules laid down by the ministry were that the deposit should be made in layers of limited depth and each layer covered on all exposed surfaces by 9 in. of earth or other suitable material, care being taken that only a limited surface of refuse should be exposed at any time during the process of tipping, and that no refuse should be left uncovered for more than twenty-four hours after the time of deposit. It was also required that screens or other suitable apparatus should be provided to prevent paper or other debris from being blown by the wind. In addition, it was required that deposit in water must be avoided as far as practicable if likely to cause nuisance, and reasonable precautions taken against the breeding of vermin or flies or the breaking out of fires. Refuse consisting mainly of organic material must be covered with not less than 2 ft. of earth; each layer of refuse must be allowed to settle before the next is added; care must be taken to avoid raising the surface of the tip above the general level of the adjoining ground; competent labour must be employed to enable the necessary measures to be taken for the prevention of nuisance; all refuse must be disposed of with such dispatch and be so protected during transit as to avoid risk of nuisance.

Considerable quantities of salvage are now separated during the processes of refuse collection and disposal. Early sorting—i.e. on the vehicle—is advantageous, for some materials greatly deteriorate in value if not segregated as soon as possible. At the tip or destructor site, sorting is effected partly by mechanical screening and partly by hand picking. In some plants iron is removed by magnets. The nature of refuse has changed in recent years, having now a lower calorific value than formerly, and this renders incineration more expensive. Digestion of refuse with sewage sludge, besides disposing of organic material without nuisance, provides additional quantities of methane which can be used for power for heating purposes. See also DESTRUCTORS; PUBLIC HEALTH; SANITATION OF BUILDINGS; SEWERAGE. See F. R. Matthews, *Refuse Disposal*, 1915; A. L. Thomson, *Modern Public Cleansing Practice*, 1939; Amer. Public Works Association, Committee on Refuse Collection and Disposal, *Refuse Collection Practice*, 1911.

Regal, small portable organ, said to have been invented about 1460 by Heinrich Traxdorff of Nuremberg, but existing in various forms much earlier as the portable or positive organ, which could be held by a band slung round the player's neck, one hand playing the keys and the other working the small bellows, or placed on a table, with the bellows worked by the feet or by another person.

Regaluto, tn. 25½ m. W.N.W. of Catania, in the prov. of Catania, Sicily. In the campaign of 1913 the churches Madre and S. Maria alla Croce sustained some damage. Pop. 11,900.

Regalia: 1 The ensigns or visible marks of royalty, or, in a more accurate and restricted sense, the ser. parts of the apparatus of a coronation. Though different countries have very different R., or crown jewels, varying greatly in value, a richly jewelled crown is commonly the chief of the insignia of sovereignty. In England the chief R. properly so called are the three crowns, the queen's crowns or diadems, the king's royal and other sceptres, the two orbs, the jewelled sword of state and four other state swords, the ampulla and spoon, the golden spurs of chivalry and coronation ring, the state trumpets, and the bracelets or armillas. The crown of England is the crown copied from St. Edward's crown in the time of Charles II., the original having been destroyed by the Protectorate. It is a circlet of gold embellished with rosettes of precious stones, ringed by diamonds. From the circlet rise four crosses-paté and fleur-de-lis, and from the former rise golden arches symbolising independent sovereignty. The imperial state crown is worn, after the coronation, by the reigning monarch on state occasions. The existing crown was made for Queen Victoria in 1838, and its constituent gems are of very ant. origin. They include a sapphire from Edward the Confessor's ring, the Black Prince's ruby, a sapphire from the crown of Charles II., pearl ear-drops of Queen Elizabeth, and in front is the second Star of Africa, weighing 309½ carats, cut from the Cullinan diamond. Altogether the crown, the most beautiful of all crowns, has 2783 diamonds, 277 pearls, seventeen sapphires, eleven emeralds, and five rubies. The imperial crown of India was made on the occasion of the Durbar held by George V., because neither of the above-mentioned crowns may be taken out of Britain. It has 6000 diamonds, four sapphires, four rubies, and six emeralds, all of unusual size and quality. It is designed on the pattern of the crown of England. The crown of Mary of Modena, consort of James II., is studded with diamonds and pearls, and her diadem of diamonds and pearls, which latter is reputed to be worth more than £100,000. Queen Mary's crown is the personal property of the Dowager Queen Mary, widow of George V. It is a beautiful light diamond crown, with detachable half-arches and bears in front the Kohinoor diamond. The Prince of Wales's crown resembles a peer's coronet, but has one

arch over it supporting a gold *monde* and cross. It was made specially for Edward VIII. when he was Prince of Wales. The royal sceptre, with the cross, is enriched with gems, including the larger Star of Africa, cut from the Cullinan. The other four sceptres in the R. are the king's and queen's sceptre with the dove, the queen's sceptre with the cross, and the queen's ivory rod. *The Orbs*: The orb and cross together are held to signify the domination of the Christian religion over the world. There are two orbs, the queen's being made on the occasion of the joint coronation of William and Mary. The king's orb is of polished gold, studded with large pearls, rubies, sapphires, and emeralds, and is larger than the queen's. The jewelled sword is made of Damascus steel, the scabbard being studded with precious stones. It originates from the coronation of George IV.; at the coronation ceremony the monarch hands it to the archbishop of Canterbury as a symbol that he puts his sword at the service of the Church. It is said to be the most valuable sword in the world. *The Four State Swords*: The sword of state is a two-handed sword, with a blade 32 in. long, gilt metal handle, and cross-pieces representing the lion and unicorn. The scabbard is adorned with precious stones in designs of the rose, the thistle, and the shamrock. At coronation ceremonies the peer who carries it hands it to the lord chamberlain, who gives him in exchange the jewelled sword; the second sword is the sword of justice to the spirituality; the third the sword of justice to the temporality; and the fourth is known as Curtana, and has the blade curtailed and squared to symbolise mercy. The ampulla or golden eagle and the anointing spoon are used at the coronation for anointing the monarch. They are very ant., appear to be of Byzantine origin, and luckily escaped the Puritanical hand of the Protectorate. *The Spurs and Coronation Ring*: Like the jewelled sword, the spurs of St. George are placed on the altar by the monarch at his coronation, with the same symbolical significance. The spurs are the emblem of knighthood and chivalry, and were made for the crowning of Charles II. The ring of rubies and one very fine sapphire circled with diamonds represents in design the cross of St. George. The state trumpets are of silver, with red and golden silk bannerets with royal arms and cipher; they are used for fanfares on great state occasions such as the reading of proclamations. From the earliest time, even in ant. Heb. days, a bracelet was one of the insignia of royalty. The bracelets in the Eng. R. are of gold, enamelled with rose, lily, thistle, and fleur-de-lis, but these are not used in modern coronation ceremonies. The R. of Scotland comprise the crown, sceptre, sword of state, and nace. The Eng. R. are kept in the Tower of London, those of Scotland in Edinburgh Castle. The Irish crown jewels were stolen from Dublin Castle and have never been found, but they comprised nothing of any great intrinsic value. (See Sir G. and G.

Davenport, *The Crown Jewels of England*, 1919.)

Of European R. there is extant the crown, the sword (*La Joyeuse*), and spurs of Charlemagne. The crown is fashioned of gold plates, enamelled with representations of Solomon, David, Hezekiah, and Christ. The sword has a golden scabbard with cloisonné enamel and precious stones; Napoleon I. brought it from Vienna to the Louvre in Paris. The Bourbon crown, introduced by Louis XIV., was generally adorned lavishly with diamonds, surmounted by a double fleur-de-lis. The Fr. crown diamonds and gems were frequently reset for each succeeding monarch, but many famous jewels and stones were lost during the revolution. The leading example of R. is the iron crown of Lombardy, consisting of a broad band of gold with rosettes of enamel and precious stones, with an inner circlet of iron supposed to have been wrought from a nail of the true cross. The crown of the former Ger. empire, dating from the Franco-Ger. war of 1871, is fashioned on the model of that of Charlemagne. Most of the former Ger. states each had their own crowns and jewels. Austrian R. included the imperial crown made for Rudolph II., and the older crown of Hungary or St. Stephen of the tenth century. The imperial crown made for Catherine II. of Russia was one of the sumptuous items of the R. of the Romanoffs, which were formerly kept at the Winter Palace. Another is the imperial orb surmounted by a diamond cross, and especially the imperial sceptre with the famous Orloff diamond, a wonderful yellow stone, set atop. Tradition says that this gem was looted from an idol in a Hindu temple and sold to an Armenian trader, who in his turn sold it for £40,000 to Prince Orloff, who gave it to Catherine II. in 1772. The Soviet Gov. have valued it at £2,000,000. Spain possesses sev. fine emeralds among her crown jewels, and might have had more had Hernando Cortez acted on Queen Isabella's hint and handed over to her all he brought back from his conquest of Mexico. See Mary Abbott, *Jewels of Romance and Renown*, 1933.

2. The attributes or privileges of or belonging by virtue of his prerogative to the sovereign, which, according to writers on civil law (*q.v.*), comprise the power of life and death, war and peace, the administration of justice, monopoly of coinage, the power of assessment, and the ownership of waifs, estrays, royal fish, treasure trove, etc.

See also CROWN.

Regality, Burgh of, see BURGH.

Regelation, see ICE.

Regency Style, see GEORGIAN ARCHITECTURE.

Regeneration, in physiology, the repair or renewal of lost or diseased structures, as, for example, the regrowth of a tail by a lizard. The phenomenon of R. must be considered in relation to ascertained facts about the growth and reproduction of cells. Every organism has developed from a single cell. The initial cell, there-

fore, must be considered as having within it the potentiality for completing the organism. This potentiality, however, is a highly complex thing, and, as the cell divides and still further subdivides, certain aspects of this potentiality tend to become prominent, and others are thrust into the background, even to the point of obliteration. In other words, cells are differentiated to perform more or less specialised functions, to form nerve, muscle, epithelium, etc. It should not be supposed that the specialisation is ever complete, for under certain circumstances the cell may modify its function to adapt itself to an abnormal condition. This adaptation may lead to the formation of a structure similar to one which has been lost by accident or disease. The extent of the adaptation appears to vary considerably in different organisms. Some structures can only be replaced by the action of cells of the same general form; thus, in man, lost epithelium is replaced from epithelium. Other organisms have the power of replacing homologous structures in a complex degree. In other cases the potentiality of the cells to reproduce quite a different structure seems to have persisted; thus certain insects have been known to produce a wing in place of a leg, and lobsters have produced a limb in place of an eye-stalk. The capacity for R. seems to be greater among the lower animals. Amphibia are able to replace the whole epidermis, salamanders replace their limbs, lizards their tails. Arthropods regenerate their limbs; molluscs are able to replace heads and feet, fishes can replace their fins. Among birds and mammals the capacity for R. is very restricted. Birds replace feathers in the process of moulting; mammals replace hair, skin, and horns. In man it may generally be said that lost parts can only be replaced by adjacent tissue of the same kind; broken bones reunite, and flesh wounds heal if the parts are put in juxtaposition. If epithelium is extensively destroyed, as in the case of a burn, it is replaced by scar-tissue. Plants have great powers of R. and use is made of those powers in the propagation of cultivated species from cuttings, grafts, etc. It is said that some weeds, such as the horse-radish, can be completely regenerated by any fragment containing a few intact cells.

Regeneration, theological term used to denote the change by which one becomes a member of the Church. All Christian Churches are agreed as to its necessity, and base the doctrine on the words of Christ to Nicodemus: 'Except a man be born again (or from above) he cannot see the kingdom of heaven.' In the Catholic Church R. is identified with the reception of sanctifying grace in baptism and the term is therefore equivalent to initial justification. Most Protestants, on the other hand, make R. a sensible change of heart and life, not necessarily connected with any external rite. The doctrine of R. was the cause of a furious controversy in the Anglican Church during the nineteenth century, and the insistence on

baptismal R. was one of the main causes of the secession in America of the Reformed Episcopal Church.

Regensburg, see RATISBON.

Regent, one who exercises the power of sovereign during the absence of, or owing to the incapacity of, the sovereign. No provision had been made for a R. during the temporary absence of the sovereign since 1837—when it was provided that the gov. should be carried on by lords justices in the event of the queen's decease whilst the heir (the king of Hanover) was abroad—until 1937. The office of R. in early times usually fell to the justiciar (q.v.) in the event of the sovereign's absence, though William I., during his absence in Normandy in 1067, left as Rs. his half-brother Odo, earl of Kent, and Wm. FitzOsbern, earl of Hereford. The chief instances of Rs. in Eng. hist. between 1190 and 1837 are the following, and they illustrate the transition from the despotic and personal character of the kingship under the Norman and Angevin or Plantagenet kings to the struggle between the king and barons over the limitation of royal power and, thereafter, to the gradual development of parl. and constitutional control of the royal power and prerogative; in 1190 Richard I. on departing for the crusade appointed the chancellor, Wm. Longchamp, guardian of the kingdom. In 1216, owing to the minority of Henry III., the barons chose Wm. Marshall, earl of Pembroke, *rector regis et regni*. In 1272, Edward I. being abroad at the death of Henry III., the king's council assumed the functions of regency, the gov. being carried on by the archbishop of York, assisted by others. In 1297 Edward I., on joining his army in Flanders, left his son Prince Edward as R., together with an assisting council of regency. It was this regency that provisionally accepted the *Confirmatio Cartarum* and sent it to the king for ratification. In 1327, at the accession of Edward III., a minor, Parliament appointed a regency of bishops, earls, and barons. In 1377 in Richard II.'s minority no R. was appointed, but a council of twelve was named by the barons, though this council was frequently modified by Parliament which had the real control. In 1422 Henry V., at his death, named the duke of Gloucester R., but the peers, having searched for precedents, found that the late king could not, without the assent of the estates, dispose of the gov. after his death. Accordingly Parliament appointed the duke of Bedford or, in his absence, the duke of Gloucester to be the protector and defender of the kingdom and English Church, and the King's chief counsellor. Sixteen counsellors were subsequently added by Parliament, and the peers declared that the protector's power was limited to defence of the realm against internal and external enemies. The following important principles may be deduced from this regency of 1422: (1) that the king cannot nominate a R. during the minority of his successor; (2) that neither the heir apparent, nor any other person, is

entitled to exercise the royal prerogative during the infancy of the king; (3) that Parliament alone has the right to nominate a R. and to determine his powers. In 1454, owing to Henry VI.'s insanity, the peers chose Richard, duke of York, protector, and Parliament confirmed the appointment. In 1483, on the accession of Edward V., Richard, duke of Gloucester, was appointed protector by the king's council. In 1547 sixteen executors were appointed as a regency during the minority of Edward VI.—this being in accordance with a statute of 1536; these executors chose the earl of Hertford as protector. In 1751 a Regency Act, passed on the death of Frederick, Prince of Wales, made the princess dowager of Wales R. in the event of a child of hers succeeding under eighteen, and also nominated a council or regency. In 1765 owing to the illness of George III. a Bill was passed appointing a council of regency and defined their duties; the king was empowered to nominate as R. either the queen, the princess dowager of Wales, or any descendant of George II. In 1788 George III. became insane, and Fox supported the right of the Prince of Wales to be R., but Pitt maintained the right of Parliament to make the appointment. It was decided to create a regency by statute, which of course required the royal assent, and eventually the two Houses of Parliament concurred in directing the chancellor to put the great seal to a commission for giving the royal assent; but the king recovered before the Bill was carried. In 1810 George III. again became insane and the Prince of Wales was appointed R., the Bill was passed (1811), and the royal assent given by commission. The R.'s power was limited; thus he could not, for twelve months, create peers nor grant offices and pensions, except during pleasure. The provision made in 1837 has been stated above. It was further provided (1840) that in the event of a child of the queen succeeding under eighteen, the prince consort was to be R.

Of these appointments those in the reign of George III. are of the greatest constitutional importance, it having been then settled that no one, not even the heir apparent, had the right to be R. without nomination. In case of a minority Parliament would pass a provisional Act to meet the requirements of the particular case. Thus in 1830 a Regency Bill provided for the administration of the gov. in case the Princess Victoria should succeed before her majority; and again, in 1910, Queen Mary was nominated R. in case of the death of George V. leaving a minor as heir. Further legislation was passed in 1937 and 1943; the Regency Act, 1937, provides that in the event of the illness of the sovereign or of his absence or intended absence from the United Kingdom, certain of the royal functions may be delegated to persons who are nominated counsellors of state e.g. the queen, the duke of Gloucester, the duke of Kent, (d. 1942), but from among the persons in the line of succession to the Crown

who may be nominated, the Act excludes any who are not of full age. The amending Act of 1943, however, provides for including the person who is heir apparent or heir presumptive if over the age at which the accession of the sovereign does not necessitate a regency, viz. eighteen. Under the Act of 1937 the heiress (Princess Elizabeth) while between the ages of eighteen and twenty-one could have succeeded the sovereign with full powers, but could not have been his deputy. The Act of 1943 therefore provides that 'the heir apparent or heir presumptive to the throne, if not under eighteen years, shall not be disqualified from being a Counsellor of State by reason only of his not being of full age.' The Act of 1937 further provides that the sovereign or the R. may in the event of illness not amounting to incapacitation, or absence from the United Kingdom, delegate to the counsellors certain of the royal functions, which would not include the power to dissolve Parliament or grant any title of peerage.

Reger, Max (1873-1916), Ger. composer, b. at Brand, Bavaria, studied with Riemann, and became teacher in 1895-96 at Wiesbaden Conservatoire, later prof. after 1907. His music is very original, of consummate technical skill with very great dexterity of contrapuntal part-writing, and usually of great difficulty. It has also transcribed compositions by Bach, Richard Strauss, and others, with success. His best work was for the organ, but he also composed many pieces for orchestra and piano. Variations on a theme proved the best mode for his ideas, and with Brahms he is the best exponent of this form in the nineteenth century. His work includes chamber and church music, tone-pieces, fugues, songs, etc. See lives and studies by K. Hasse, 1921; H. Unger, 1921, 1924; G. Bagier, 1923; S. Kallenberg, 1930; E. Reger, 1930; F. Stein, 1939, 1941; and L. Taube, 1941.

Reggio di Calabria: 1. Prov. of Italy. Pop. 659,400. See CALABRIA (2). 2. City and archiepiscopal see of Calabria, Italy, cap. of the prov. of Reggio, on the strait of Messina, 9 m. from Messina. It was founded in 720 B.C., and was one of the most flourishing tns. of Magna Græcia. It fell into the hands of the Romans. In 281, and Caesar gave it the name of Ithegium Julii. It was entirely rebuilt in 1783. It has sev. times suffered from earthquake, and was totally destroyed in Dec. 1908, when about 35,000 persons perished. R. was taken by Brit. forces soon after the conquest of Sicily (1943). Pop. 144,300.

Reggio Emilia: 1. Prov. of Italy, bounded on the N. by Mantua. It is mountainous in the N., the highest point being Monte Cusna (6420 ft.), but in the N. it forms a fertile plain watered by the Secchia. It is rich in agriculture, producing rice, wheat, fruit, wine, chestnuts, and olives; and there are also some minerals, notably copper, sulphur, and iron. The chief manufs. are silk, leather, paper, glass, and porcelain. Area 884 sq. m. Pop. 398,100. 2. Or R. nell' Emilia, city of Italy, cap. of the above, 15 m. from Modena. It has a thirteenth-

century cathedral, a library with many valuable MSS., and the natural hist. collection of Spallanzani. Its theatre (1857) is one of the finest in Italy. The tn. is the centre of a rich agric. dist., and its industries include the rearing of silkworms, printing, and the manuf. of cloth and silk goods, cheese, matches, and brushes. Pop. 106,700.

Regiam Majestatem, title given to a collection of anct. laws, reputed to have been compiled by order of David I., king of Scotland (see Scott, *Border Antiquities*). The general assumption is that this compilation is a mere copy of the celebrated *Tractatus de Legibus Anglorum* of the justiciar Ranulf de Glanvill.

Regicides, term applied to people who bring about the death of a king, more particularly to the men who were appointed on the parl. committee to try King Charles I., and the members of the Fr. Convention who voted for the death of Louis XVI. Of the sixty-seven judges who sat in trial upon Charles I., fifty-nine signed the death warrant. After the Restoration the R. were brought to trial, some were executed and some sentenced to imprisonment for life, while, of those who were dead already, Cromwell, Ireton, and Bradshaw were condemned, and their bodies hanged at Tyburn.

Regillus, lake of anct. Italy, near the Tuscan Hills, in Latium. It was the scene of a battle in 496 B.C., between the Romans and the Latins.

Regiment (Late Lat. *regimentum*, from *rego*, I rule), largest permanent unit of the Brit. Army. The development of the R. may be dated from the sixteenth century, when armies were permanently organised in companies and Rts. The earliest form of organisation of cavalry was in troops (*q.v.*) and of infantry in companies, each of which carried its own banner long after they were organised into Rts. As warfare became more scientific, the battalion and the squadron were introduced as the fighting formations of infantry and cavalry respectively. At first battalions were composed of many Rts., and were gradually reduced till they formed only fractions of a R. Finally Rts. were made of uniform strength, and the battalion became a fixed fraction of a R., but in the Brit. Army most Rts. consisted of only one battalion until the army was reorganised in 1881, and now consist of two regular battalions, commanded by lieutenant-colonels. The different battalions which compose a R. have their own system of administration, and are, to all intents and purposes, separate, serving in different parts of the empire under the control of the United Kingdom Gov. A R. of infantry comprises the regular and territorial army battalions, and all are under the 'Colonel of the Regiment,' who is usually a distinguished general officer who has served in the R. The Rs. of Foot Guards, however, have no territorial battalions, and the number of their regular battalions varies—Grenadiers three, Coldstreams three, Scots two, Irish one, and Welsh one. Corps like the Corps of R.E., Royal Corps of Signals, R.A.S.C.,

Regiment

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Regiment

No.	Date Raised	Title in 1881
1*	1633	Royal Scots
2*	1661	Queen's Royal West Surrey
3*	1665	Buffs (East Kent)
4*	1680	Lancaster
5*	1685	Northumberland Fusiliers
6*	1673	Warwickshire
7	1685	Royal (English) Fusiliers
8	1685	King's Liverpool
9	1683	Norfolk
10	1685	Lincolnshire
11	1685	Devon
12	1685	Suffolk
13*	1685	Somerset Light Infantry
14*	1685	West Yorkshire
15	1685	East Yorkshire
16*	1688	Bedfordshire and Hertfordshire
17*	1688	Leicestershire
18*	1684	Royal Irish
19	1688	The Green Howards
20	1688	Lancashire Fusiliers
21*	1678	Royal Scots Fusiliers
22	1689	Cheshire
23*	1689	Royal Welch Fusiliers
24	1689	South Wales Borderers
25*	1689	King's Own Scottish Borderers
26	1689	1st Cameronians (Scottish Rifles) (see 90)
27	1690	1st Inniskilling Fusiliers (see 108)
28*	1694	1st Gloucestershire (see 61)
29	1694	1st Worcestershire (see 36)
30	1702	1st East Lancashire (see 59)
31	1702	1st East Surrey (see 70)
32	1702	1st Duke of Cornwall's Light Infantry (see 46)
33*	1702	1st West Riding (see 76)
34	1702	1st Border (see 53)
35	1701	1st Royal Sussex (see 107)
36	1701	2nd Worcestershire (see 29)
37	1702	1st Hampshire (see 67)
38	1702	1st South Staffordshire (see 80)
39	1702	1st Dorset (see 54)
40	1712	1st South Lancashire (Prince of Wales's Volunteers) (see 82)
41	1719	1st Welch (see 69)
42*	1743	1st Black Watch (see 73)
43	1741	1st Oxford and Buckinghamshire Light Infantry (see 52)
44	1741	1st Essex (see 56)
45*	1740	1st Sherwood Foresters (see 95)
46	1741	2nd Duke of Cornwall's Light Infantry (see 32)
47	1741	1st North Lancashire (see 81)
48	1741	1st Northamptonshire (see 58)
49	1741	1st Royal Berkshire (see 66)
50	1755	1st Queen's Own Royal West Kent (see 97)
51	1755	1st King's Own Yorkshire Light Infantry (see 105)
52	1741	2nd Oxford and Buckinghamshire Light Infantry (see 43)
53	1755	1st Shropshire Light Infantry (King's) (see 85)
54	1755	2nd Dorset (see 39)
55	1755	2nd Border (see 34)
56	1755	2nd Essex (see 44)
57	1755	1st Middlesex (see 77)
58	1750	2nd Northamptonshire (see 48)
59	1755	2nd East Lancashire (see 30)
60*	1755	King's Royal Rifle Corps (formerly Royal Americans)
61	1756	2nd Gloucestershire (see 28)

62*	1757	1st Wiltshire (see 99)
63	1756	1st Manchester (see 96)
64	1756	1st North Staffordshire (was 2nd/11th till 1758) (see 98)
65*	1756	1st York and Lancaster (see 84)
66	1756	2nd Royal Berkshire (see 49)
67	1756	2nd Hampshire (see 37)
68*	1756	1st Durham Light Infantry (see 106)
69*	1756	2nd Welch (see 41)
70	1758	2nd East Surrey (see 31)
71*	1766	1st Highland Light Infantry (see 74)
72*	1778	1st Seaforth Highlanders (see 78)
73*	1766	2nd Black Watch (see 42)
74	1787	2nd Highland Light Infantry (see 71)
75	1787	1st Gordon Highlanders (see 92)
76	1787	2nd West Riding (see 33)
77	1787	2nd Middlesex (see 57)
78*	1793	2nd Seaforth Highlanders (see 72)
79*	1793	Cameron Highlanders
80	1793	2nd South Staffordshire (see 38)
81	1793	2nd North Lancashire (see 47)
82	1793	2nd South Lancashire (see 40)
83*	1793	1st Royal Irish Rifles (see 86)
84	1793	2nd York and Lancaster (see 65)
85	1794	2nd Shropshire Light Infantry (King's) (see 53)
86	1799	2nd Royal Irish Rifles (see 83)
87*	1793	1st Royal Irish Fusiliers (see 89)
88*	1793	1st Connaught Rangers (see 94)
89	1794	2nd Royal Irish Fusiliers (see 87)
90	1794	2nd Cameronians (Scottish Rifles) (see 26)
91*	1794	1st Argyll and Sutherland Highlanders (see 93)
92	1794	2nd Gordon Highlanders (see 75)
93*	1800	2nd Argyll and Sutherland Highlanders (see 91)
94*	1800	2nd Connaught Rangers (see 88)
95*	1800	2nd Sherwood Foresters (see 45)
96	1800	2nd Manchester (see 63)
97	1798	2nd Queen's Own Royal West Kent (see 50)
98	1824	2nd North Staffordshire (see 64)
99	1824	2nd Wiltshire (see 62)
100*	1858	1st Leinster (see 109)
101*	1861	1st Munster Fusiliers (see 104)
102*	1861	1st Dublin Fusiliers (see 103)
103*	1861	2nd Dublin Fusiliers (see 102)
104*	1861	2nd Munster Fusiliers (see 101)
105*	1861	2nd King's Own Yorkshire Light Infantry (see 51)
106*	1861	2nd Durham Light Infantry (see 68)
107*	1861	2nd Royal Sussex (see 35)
108*	1861	2nd Inniskilling Fusiliers (see 27)
109*	1861	2nd Leinster (see 100)
	1800	1st Rifle Brigade
	1805	2nd Rifle Brigade
	1855	3rd Rifle Brigade
	1857	4th Rifle Brigade

etc., are Rs. to all intents and purposes, but there is no battalion organisation. In the U.S.A. an infantry R. consists of a headquarters, one H.Q. company, one service company, one cannon company, one anti-tank company, and three battalions. A U.S. cavalry R. consists of one regimental H.Q., one H.Q. troop, one service troop, and two squadrons. In most foreign armies a R. is commanded by a colonel, whilst the executive command of the battalions is held by majors (or commandants). The First World War brought into being tank Rs. and armoured-car Rs., while many of the police and pioneer Rs. have disappeared, particularly those of the Indian Army. In the Second World War there was also the Royal Air Force R. There exist two main methods of identification of Rs., viz. numbering and territorial names. For active service purposes Rs. are allotted distinctive abbreviated titles for correspondence and inter-communication, such as by telegraph and telephone.

INFANTRY.—On p. 86 will be found a list of Brit. infantry Rs. of the line, in order of seniority down to the absorption of the East India Company's army in 1861.

* *Notes.*—1. From 1633 to 1636 known as Hepburn's R. It was recalled from Dutch service by James II and named and numbered by him. 2. Under Charles II. called the Tangier Foot. 3. Under Charles II. called the Holland R., because it was formed from troops discharged from the Dutch service. 4. The King's Own Royal R. 5. Raised privately in Holland in 1674. 6. Until 1680 served the Dutch Gov. on contract. 13. Prince Albert's. Became Light Infantry in 1822. 14. The Prince of Wales's Own. 16. From 1792 to 1809 was the Buckinghamshire R. 17. Princess Alexandra's Yorkshire R. 18. Disbanded in 1922. 21. Raised on the Scottish Estab. as the Earl of Mar's R. 23. From independent companies raised in 1686. 25. Originally Leven's R. It received its present title in 1805. 28. Originally Bragg's R. 33. The Duke of Wellington's R. 42. From independent companies formed in the reign of William and Mary and amalgamated in 1729 as the Royal Highlanders. It reverted to the old title in 1751. 45. The Nottinghamshire and Derbyshire R. 60. As the Royal Americans had four battalions, of which the second after the revolution became the 60th Rifles of Canada and the 3rd became the 63rd R. of Nova Scotia. The first battalion was transferred to the United Kingdom estab. and also formed three new battalions which continued to exist until 1922. 62. Originally 2nd Lancaster R. 65. 2nd Suffolk until 1758. 68. 2nd Royal Welch Fusiliers until 1758. 69. 2nd South Wales Borderers until 1757. 71. City of Glasgow R. 72. Raised in 1756 as Fraser's Highlanders. 73. Until 1786 this number was borne by the 1st Highland Light Infantry (71). 78. Raised in 1757 as 2nd Highlanders. 79. Raised in 1757 as Drake's Highlanders. 83. Became Royal Ulster Rifles in 1922. 87. Princess Victoria's; became Royal Ulster Fusiliers in 1922. 88. Disbanded in 1922.

91. Formerly Argyll Foot. 93. Formerly Sutherland Foot. 94. Disbanded in 1922. 95. Two battalions of this R. were raised in 1800 and 1805. In 1816 they adopted the title Rifle Brigade and ceased to use the number, and a new 95th R. was formed which became the 2nd Sherwood Foresters. The 3rd and 4th regular battalions of the Rifle Brigade were disbanded in 1922. 100. Originally raised in Canada as the Prince of Wales's Royal Canadians; disbanded in 1922.

101–109. Transferred from East India Company's service. 101. Ex-Royal Bengal Fusiliers, raised in 1759. 102. Ex-Royal Madras Fusiliers, raised in 1746; later called Madras European R. 103. Ex-Bengal Fusiliers, raised in 1661 as the Bombay R., and later called Royal Bombay Fusiliers. 104. Raised in 1839 as 2nd Bengal European R. 105. Raised in 1839 as the 2nd Madras European Light Infantry. It became the Madras Light Infantry and transferred to the United Kingdom in 1861. 106. Ex-Bombay Light Infantry, raised in 1839 as 2nd Bombay European Light Infantry. 107. Raised in 1854 as 3rd Bengal European R. 108. Ex-3rd Madras Europeans, raised in 1854. 109. 3rd Bombay Europeans, raised in 1882.

Expansion of Infantry, 1642–1922.—The preceding list gives an impression of the expansion of regular land forces of the Brit. Crown since the Civil war. Apart from two Rs. of foot guards, Charles I. had only the Royal Scots when the Great Rebellion broke out. At the Restoration some veterans of the New Model Army enlisted in new Rs. under Charles II., who sent most of them abroad in the service either of the king of France or the states-general. A much greater expansion occurred under James II., who raised ten Rs. of foot, mostly to put down Monmouth's rising. Despite the territorial titles these Rs. now bear their original rank and file were predominantly Irish Catholics. The next large group was that raised by William III. for the war in Ireland against James II. and the War of the League of Augsburg in the Low Countries, bringing the total of line Rs. to twenty-nine. The eleven Rs. next in seniority were raised at the instance of Marlborough for the wars of Queen Anne's reign.

George I. did little to increase the infantry estab. (but see *Cavalry*, p. 88). The War of the Austrian Succession and 'the 45' required, however, the creation of nine new Rs., while seventeen were raised for the long and wearing campaigns of the Seven Years war in N. America and India. Three years after this recruiting for Highland Rs. other than the Black Watch began. Eighteen new Rs. were formed during the wars of the Fr. Revolution and Empire, but this does not fully represent the expansion that took place at this time, for many second battalions were formed and later disbanded, besides regiments which no longer exist. But certain rifle and light infantry Rs. were expanded to four battalions and retained this strength until

	<i>Horse</i>	<i>Dragoon Guards</i>	<i>Dragoons</i>
1 1661	Tangier - - - - -	1 1693	Royals
2 1678	- - - - - 1	1746	King's
3 1685	- - - - - 2	1746	Queen's Bays
4 1685	- - - - - 3	1746	Prince of Wales's (3/6)*
5 1685	- - - - - 4	1788	(1/7)
6 1685	- - - - - 5	1788	Inniskilling (5/6 Dragoon Guards)
7 1685	- - - - - 6	1691	Carabiniers (3/6)
8 1688	- - - - - 7	1788	(4/7)
		1 1693	Royals
		2 1691	Scots Greys
		3 1685	King's Own - - -
		4 1685	Queen's Own - - -
		5 1685	Disbanded 1799
		6 1689	Inniskilling (5/6 Dragoon Guards)
		7 1690	Queen's Own - - -
		8 1693	- - - - -

* 3rd Carabiniers since 1920.

During the long peace following Waterloo the total remained at rather less than 100. Only the third battalion of the Rifle Brigade was raised for the Crimea, and the fourth of the same R. for the Indian Mutiny, which led to the last major addition to the list of infantry regiments. Besides native troops, the East India Company had maintained its own Brit. Rs. since the reign of Charles II. By 1857 there were nine of them, three for each presidency, and Palmerston's Act for the Better Government of India of 1858 transferred them to the service of the Crown but under their old E. India titles. In 1861 they were finally incorporated in the line and given serial numbers. Twenty years later occurred the reform of 1881, whereby the old system of numbers came to an end and local titles were found for both regular battalions of Rs. which sometimes had had little previous connection with the place of their 'adoption.' It was considered that the traditions of the most venerable Rts. (down to the 25th Foot) were strong enough to be shared between two battalions.

CAVALRY.—The table appearing above shows the evolution of Brit. cavalry Rs. The numbers in brackets show the amalgamations of cavalry Rs. brought about in 1922. Small numbers show the date of first raising and the date of conversion. The apparently chaotic numbering of cavalry Rs. at the present day arises from successive conversions, and comparatively few Rs. have disappeared without trace. At the time of the Civil war there were two kinds of mounted troops: dragoons, who were organised as infantry and armed with large-bore pistols, and horse, or cavalry proper. Charles II. raised two Rs. of horse, the 1st, or Tangier Horse, and the 2nd, and some troops of dragoons which became the Scots Greys. James II. inherited these and raised six more Rs. of horse and three Rs. of dragoons, mostly to suppress Monmouth's rebellion. William III. converted the Tangier Horse into dragoons and designated them '1st' because they had been the senior mounted R. He also raised three more Rs. of

dragoons. He named the old 7th Horse the Carabiniers and his own 6th Dragoons the Inniskilling R. Later all the remaining horse Rs. were renamed Dragoon Guards. In 1715 the 3rd, 4th, 7th, and 8th Dragoons were made light dragoons, and six new light dragoon Rs. were raised. Between then and 1781 nine light dragoon Rts. were raised, because the old dragoons had proved unsuited to the important cavalry role of reconnaissance and pursuit. By 1799 there remained only ten Rs. of 'heavy cavalry'—seven Rs. of dragoon guards and the 1st, 2nd, and 6th Dragoons. From 1806 onwards, following the Napoleonic example, the light cavalry was divided into husars and lancers in the proportion of about three to two. In 1861 some European horse Rs. of the disbanded East India Company's army were transferred to the Crown establishment as husars (cf. table of infantry line Rts., 101-109).

See ARMY, Organisation; DRAGOONS; GUARDS, DRAGON; GUARDS (HOUSEHOLD TROOPS); HOUSEHOLD CAVALRY; HUSARS; LANCERS; SCOTTISH REGIMENTS; and separate articles on individual Rs. See also YEOMANRY.

See A. Broome, Rise and Progress of the Bengal Army, 1850; W. J. Wilson, History of the Madras Army, 1882; C. Walton, History of the British Standing Army, 1894; C. H. Firth, Cromwell's Army, 1902; R. Biddulph, Lord Cardwell at the War Office, 1901; W. Verner, Military Life of the Duke of Cambridge, 1905; J. W. Fortescue, A History of the British Army, 1910; Metro Provincial Publications, His Majesty's Regiments of the British Army, 1950; also Journal of the Royal United Services Institute; Cavalry Journal.

Regimental Marches. In the Brit. army it is a long-standing custom of regiments to adopt, by authority, a marching tune, to which the regiment marches past at reviews, and concludes a band performance with a quick-step. In many cases the R. M. are old tunes associated with the co. from which the regiment takes its name, such as *The Lincolnshire Poacher*, of the Lincolnshire Regiment, or *D'ye*

*Light Dragoons**Hussars**Lancers*

3	1715	-----	3	1859	
4	1715	-----	4	1859	
					5 1859 Re-raised (18/5)
7	1715	-----	7	1805	
8	1715	-----	8	1822	
9	1715	-----			9 1806
10	1715	-----	10	1806	
11	1715	-----	11	1840	
12	1715	-----			12 1806
13	1715	-----	13	1861	
14	1715	--	14	1861	
15	1759	-----	15	1806	
16	1759	-----			16 1806 (16/5)
17	1759	-----			17 1806 (17/21)
18	1763	-----	18	1807	
19	1759		19	1861	Ex-East India Company's 1st, 2nd, and 3rd European Cavalry
20	1759		20	1861	
21	1760		21	1861	
22	1760	Disbanded 1799			21 1896 (17/21)
23	1781	-----			23 1816 Disbanded

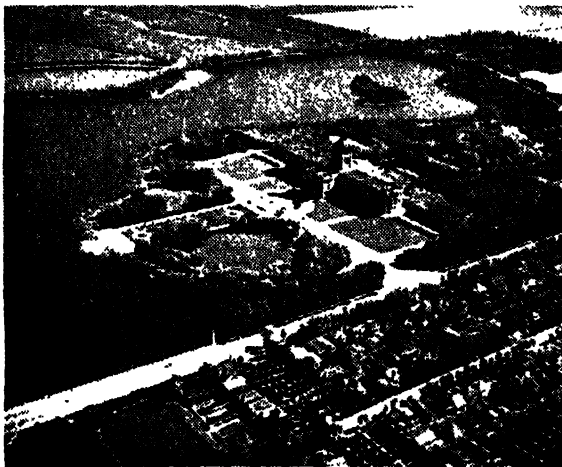
ken John Peel, of the Border Regiment. Other marching tunes commemorate famous commanders of the past: the Royal Scots, for example, still march past to the old Scottish air *Dumbarton's Drums*, recalling the fact that the regiment was enrolled in 1678 as Dumbarton's Regiment; while the duke of Wellington's (W. Riding Regiment) marches to the tune of *The Wellesley*, commemorating the fact that they were led by Col. Wellesley (later the duke of Wellington) against Tippoo Sahib. One of the most famous of all marching tunes is *Ca Ira*, the Fr. revolutionary air (see CA 1RA). The W. Yorkshire Regiment adopted their quickstep from this air at the time of the siege of Famars, in which they took part. Again, the Rifle Brigade's tune, *I'm Ninety-five*, commemorates the fact that before they were taken out of the line to be converted into riflemen they were

designated the 95th Foot. There is thus much army hist. in marchin' tunes, and the different regiments are naturally proud of the distinctive incidents with which they are associated. Among other R. Ms. are *The Young May Moon is beaming* (Notts and Derby Regiment); *Hielan' Laddie* (Black Watch and the Scots Guards), a very famous tune; *We'll gang nae mair to yon Toon* (Hampshire Regiment—which regiment has also a second march, called the *Hampshire*); *Althol Highlanders* and *Within a Mile of Edinburgh Town* (both of the Cameronians); *Kynead Slashers* and *Highland Pipers* (both the Gloucestershire Regiment); *Windsor* (Worcestershire Regiment); *Lancashire Lads* (E. Lancashire Regiment); *Southerly Wind* and *a Cloudy Sky and Lass of Gowrie* (both of the E. Surrey Regiment); *One and All* (Duke of Cornwall's Light Infantry); *Men*

of *Harlech* (S. Wales Borderers); *Blue Bonnets over the Border* (King's Own Scottish Borderers), the words of which were written by Sir Walter Scott, the song itself being founded on *General Leslie's March to Longmarston Moor*; *We've Lived and Loved Together* (Devonshire Regiment); *Speed the Plough* (Suffolk Regiment); *Prince Albert's March* (Somerset Light Infantry, the full name of which regiment is Prince Albert's Somerset Light Infantry); *The Yorkshire Lass* (E. Yorkshire Regiment); *Mountain Rose and Mandolera* (both of the Bedfordshire Regiment); *Romaika* (Leicestershire Regiment). It is curious that while the Scots and Irish regiments adhere to their own national

Gaul, which properly belongs to the Royal Scots, while *The Duke of York's March* is played by sev. cavalry regiments; and since the amalgamation of cavalry regiments soon after the First World War, there has been a blending of the R. Ms. The R.A.F. march past was composed by Sir Henry Walford Davies. The marches are played mostly on special occasions, chiefly ceremonial, but some regiments play them on the dismissal of a parade, and the particular air is followed immediately by the National Anthem. See F. J. H. Darton, *Marches of Wessex*, 1922.

Regina, cap. of Saskatchewan, 357 m. on the Canadian Pacific Railway, 357 m. from Winnipeg. It was founded in 1882.



Saskatchewan
Legislative
Buildings
and
Wascana
Lake.
REGINA

National Film
Board, Canada

melodies, the Eng. regiments draw freely upon Scottish compositions for their R. Ms., e.g. (in addition to instances given above) the tune of the Royal Lancaster Regiment is *Corn Rips are Bonnie*; that of the Cheshire Regiment is *Wha wouldna' fecht for Charlie?*; that of the Royal W. Kent Regiment is *A Hundred Pipers*, and that of the Durham Light Infantry is *Whistle o'er the Lave o't*. The Durham Light Infantry and the Royal Ulster Rifles both march past to the same air; but whereas the Durham Light Infantry calls it *The Light Barque*, the Royal Ulster Regiment knows it as *Off, Off, said the Stranger*. *Lillibullero*, the Whig political ballad which originated in the army under James II. (perhaps in the 8th Liverpool Regiment), was revived during the Second World War, and adopted by commando units as a regimental march. Some tunes are common to a number of regiments: *The 'British Grenadiers* is played by all Fusilier regiments as well as by the Grenadier Guards. The cavalry regiments have, as a rule, rather stately compositions of their own. The Scots Greys, however, adopted *The Garb of Auld*

Early in 1883 it was declared the seat of government of the N.W. Terr., in place of Battleford, and so remained until 1905, when the territory was divided. In 1903 R. became a city and in 1905 the cap. of Saskatchewan. It is the headquarters of the famous Royal Canadian Mounted Police. R. has been called 'Queen City of the Plains.' A singularly handsome centre, with many striking buildings, e.g. those of the Prov. Legislature and the Dom. Gov., it stands surrounded by a vast plain of grain fields, with a climate of abundant sunshine, and has scenic beauty and natural charm. Yet it offers all modern urb. amenities. It is a popular centre for conventions of national and international organisations of many kinds. A manufacturing tn., it has over a hundred production plants of almost every kind of industry, from artificial limbs to cars, jewellery, paints, varnishes, wagons, windows. It is an aviation centre served daily by the Trans-Pacific Airlines and Canadian Pacific Airlines main lines. There are more than 3000 ac. of parks and boulevards. There are five colleges, a normal school for teachers, six commercial

schools, a technical school, and twenty-four elementary schools. R. Symphony Orchestra and Saskatchewan Musical Festival draw music lovers to the cap. In July-Aug. the Prov. Exhibition (agric. and industrial) is the largest event of its kind in Canada next to Toronto National Exhibition. The sheep and swine show is in Nov., and the horse and cattle shows at the 'winter fair.' The pop. has increased since 1926 by 25,700. Pop. (1948) 64,100.

Regiomontanus (1136-76), Ger. astronomer, whose real name was Johann Müller, b. at Königsberg in Franconia. He studied at Vienna, where he met Purbach, and in 1461 accompanied Cardinal Bessarion to Italy. He left Rome in 1468, spending the next three years at the court of the king of Hungary, and afterwards settled at Nuremberg, where he pub. his *Tabulae Directionum* (1475). Bernhard Walther, a wealthy citizen, furnished him with means to start a book-printing business and to construct astronomical instruments, wherewith they demonstrated the inaccuracy of the Alphonsine Tables (*q.v.*).

Regional Commissioners. The Brit. Gov. in Feb. 1939, through the lord privy seal, announced its intention of designating twelve R. C., w^ho in the event of war should assume supreme control in their respective regions for such time as communications with the central gov. might be interrupted. The names of the R. C. were announced soon afterwards; they were all lord-lieutenants or men of similar standing. The R. C. were provided with deputy commissioners and with a staff consisting of A.R.P. regional officers and representatives of all gov. depts. concerned with civil defence. Before assuming their responsibilities in Sept. 1939 they were supplied with full details of the war plans of all the depts. concerned with civil defence and kept in touch with their war staff.

Regionalism, term denoting local individualism in politics; also used in literary criticism to describe a type of fiction in which the scene is set in a particular locality, and a realistic presentation of the life and work of the area is given. In Eng. literature the regional novel developed rapidly in the nineteenth century. The Brontës laid the scene of their novels in Yorkshire and George Elliot in the E. Midlands. Other examples of R. are the 'Barchinensis' novels of Trollope, and the 'Wessex' novels of Hardy. The works of Mary Webb, Sheila Kaye-Smith, Eden Phillpotts, J. B. Priestley, etc., are often examples of literary R.

Regional Planning, method of planning in advance of development large areas of land, usually under the authority of regional committees estab. by local authorities. The object is to prepare outline plans for such public services as roads and drainage, and to indicate areas for open spaces, rural preservation, industrial and residential development, etc., to which the tn. plans adopted by individual local authorities may conform. Many such committees were set up in

England after 1920, and a number of reports were issued by them. The whole subject was subsequently examined in its various aspects by the Scott and Barlow Committees, and both before and since the setting up of these committees, there was legislation on the subject of tn. and country planning. At first the central departmental authority was the Tn. and Country Planning Advisory Committee which was appointed as a dept. of the Ministry of Health, but subsequently a separate Ministry of Tn. and Country Planning was created. *See further under TOWN AND COUNTRY PLANNING.*

Registered Stock, or Inscribed Stock. Stock is said to be inscribed or registered when the name of the stockholder is inscribed in the stock register of the state or corporation issuing it. The holder is entitled to an imaginary sum, usually £100 or multiples thereof, and the right to receive a fixed rate of interest in perpetuity. The registration is evidenced by a certificate which also gives him the right to obtain payments of interest. In contradistinction to R. S. is that stock which is issued in the form of bearer bonds with dividend coupons attached.

Register of Voice, see VOICE AND VOICE TRAINING.

Registers, Parish. Registers of a kind appear to have been kept by all civilised peoples in every age. In the Rom. provs. officials were appointed as public registrars to keep records of names for the settlement of disputes, proof of freedom, and certification of births and deaths. In France it appears that registers were kept with surprising regularity from about 1308. P. R. were not regularly kept in England before 1538. From that date, however, until 1837, they form an almost complete record of the manners, customs, and events of three centuries of Eng. social hist. They have often afforded the chief evidence of titles to peerage and property, and are an invaluable source of material for all manner of historical, and genealogical research. Although public attention has frequently been called to the importance of securing the safety of P. R., Parliament has never taken effective steps to ensure that this was done. It is on record that some have been sold as waste paper or made into book covers; some at Wimpole, Cambridgeshire, were destroyed by parliamentary troops; and those at Otterinton 'were devoted to the utilitarian employment of singeing a goose.' P. R. belong in law to the parochial clergy. They are usually kept in the par. churches. Since 1837, when the records of the registrar general begin, P. R. have become bare records of baptisms, marriages, and deaths, and have thus lost their character and interest. *See also REGISTRATION OF BIRTHS, MARRIAGES, AND DEATHS. See J. C. Cox, Parish Registers of England, 1910; and T. P. Taswell-Langmead, Preservation of Parish Registers.*

Registrar: Bankruptcy.—The Rs. in bankruptcy of the high court and co. courts are the officials who hear bankruptcy petitions, make receiving orders,

hold public examination of debtors, approve compositions or schemes of arrangement, and grant orders of discharge to bankrupts.

Probate.—The R. of a dist. registry grants probate (*q.v.*) of wills or letters of administration in cases where the deceased appears at the time of his death to have had a fixed place of abode within the dist. in which application for probate is made; but in opposed applications he may only grant probate when the contention is terminated by decree or otherwise. The R. of the Principal Probate Registry (Somerset House) is an official invested with all the authority of a judge in chambers in matters of probate and divorce, except in proceedings touching the liberty of the subject, service of writs out of jurisdiction, injunctions, appeals from dist. registrars, taxation of costs, and other minor matters. The duties of a co. court R. comprise the filling up of the usual papers required by the probate court to lead to a grant of letters of administration, and transmission of the same to the R. of the probate court.

Privy Council.—To the R. of the Privy Council have been assigned by order in council, 1904, all the duties of the old R. in eccles. and Admiralty causes. He has power to examine witnesses on oath in all actions pending before the Judicial Committee of the Privy Council, and to do the chamber work of that committee, such as issuing the committee's orders and calling on parties to enter an appearance.

Friendly Societies.—As to the R. of friendly societies, see under FRIENDLY SOCIETIES.

Consistory Court.—The R. of this court, who is appointed by the bishop of the diocese, prepares faculties, sends to the registrar-general of births, deaths, and marriages a list of all the Church of England chapels of his diocese within which a marriage may be celebrated, and has duties to perform in connection with the issue of marriage licences. See also ECCLESIASTICAL COURTS.

Joint-stock Companies.—The R. of joint-stock companies registers companies formed under the Companies (Consolidation) Act, 1908. He is an officer of the Board of Trade.

County Courts.—The R. of a co. court, who must be a solicitor of five years' standing, usually hears all cases in which the amount involved is not over £2. He issues summonses, warrants, precepts, and writs of execution; registers all orders and judgments of the co. court of which he is the R., and keeps an account of all court fees and fines. He generally performs the duties of a R. in bankruptcy, and in addition performs numerous duties in interlocutory proceedings before the co. court. He must reside within the dist. of his court.

High Court Registrars.—The duties of the Rs. of the chancery court are to take notes on the judgments and orders of the judges in that court, and the court of appeal in the case of chancery appeals, to make up lists of the causes for trial before the chancery judges and assist the

judges generally during the hearing of cases.

Solicitors' Registrar.—The official whose duty it is to issue certificates empowering solicitors to practise.

Registrar-General, central authority for the registration of births, marriages, and deaths and for the taking of the periodical census. The first R.-G. was appointed in 1836. Besides taking the census and preparing the census returns, he undertakes the verification of claims by applicants for old age, widows, etc., and war pensions. See next article.

Registration of Births, Marriages, and Deaths. The registration of births, marriages, and deaths is believed to have been inaugurated about 1528; but the statutes concerning registration are of a comparatively modern date. General registration was introduced by the Registration Act of 1837, extended to Scotland in 1855, and to Ireland in 1864. Other Acts were passed in 1837, 1856, and 1858. These Acts were consolidated in the Act of 1874, but other statutes have been passed since then. The work of the registrar-general was enormously increased by the consolidating Act of 1874, which made registration compulsory, and also by the Births and Deaths Registration Act, 1926, the Legitimacy Act, 1926, and the Adoption of Children Act, 1926. This legislation created a general registry office, situated at Somerset House, Strand, London, W.C., at the head of which is an official known as the registrar-general of births, marriages, and deaths. The whole kingdom is divided for purposes of registration into dists. controlled by superintendent registrars, each dist. being further subdivided into smaller dists. under local registrars. The object of the Registration Acts is primarily to furnish official proof of a birth, marriage, or death, but the utility of systematic registration is manifest in a number of different ways. The science of eugenics and the laws of public health alike derive much useful material from the returns of the registrar-general, while the severe penalties against wilful neglect to register births and deaths probably operate to some extent to diminish the evil of infanticide (*q.v.*). Prior to these Acts births were customarily proved by certificates of baptism, or, if none, by entries in family Bibles, while marriages were proved by certificates or by similar entries, and deaths by nothing more trustworthy than inscriptions on tombs. The dates of births prior to July 1837 can be ascertained from the registrar-general in cases where they have been recorded in church registers deposited since 1837 in the General Registry Office; if not so deposited reference must still be made to the church or chapel of the locality where the birth is believed to have been recorded. Similarly a certificate of a marriage solemnised before July 1837 is to be obtained either from the registrar-general or from the particular church where it was celebrated. Where the record of a particular birth, death, or marriage cannot be traced, a search should always be

made in the books kept by the superintendent-registrar where the event is believed to have taken place, especially in the case of a recent event, because the local officials may not have had time to transmit their records to Somerset House. Births must be registered within six weeks, including, of course, those of illegitimate children. The obligation to register the birth of a legitimate child is on the parents, or, in default, any one in charge of it. The putative father of an illegitimate child is not bound to register its birth, the obligation being on the mother, and the putative father's name can only appear on the register by joint consent of himself and the mother. A new form of birth certificate became available from 1947, showing only name, sex, date, and place of birth, but excluding details of parentage or adoption. A birth cannot, except by the written authority of the registrar-general, be registered after the lapse of twelve months from the event.

By the Notification of Births Act, 1907, the local authority, in various places where the Act has been adopted, must also be notified of a birth. It is to be noted that the notification to the medical officer of health under the Act of 1907 is in addition to the registration under the Registration Acts. It must be given in writing, subject to a penalty of 20s. for default, within thirty-six hours after the event. The birth of seven-months' children must be registered under this Act whether they be still-born or not. Deaths must be registered within five days of the event. The mode of registration is for the nearest relative of the deceased present at the death, or, if none, any other relative or inmate of the house in which the death took place, to send to the registrar a written notice of the death, accompanied by a medical certificate as to the cause of death. But, as in the case of a birth, a death may not, without consent, be registered after the expiry of twelve months. If an inquest is held it is for the coroner to send up to the registrar the necessary information for registration. The registrar delivers to the person registering a death a certificate, which document is the authorisation to any person to bury the body and perform the funeral service. Still-born children can be buried in any burial-ground only after the person controlling the ground has been supplied with certain particulars. Marriages are registered by the officials solemnising them with the registrar-general at Somerset House (or in Scotland the registrar-general's office, Edinburgh), where the register may be inspected on payment of 1s. fee (*see also under MARRIAGE; FEES*). By the Local Gov. Act, 1929, the functions of boards of guardians under the various registration Acts are transferred to co. councils or co. bors. Registrars (paid by fees) have now been largely replaced by salaried officials appointed by councils. *See also CENSUS; VITAL STATISTICS. See R. R. Kuczyński, Measurement of Population Growth, 1935, and H.M.S.O. (Ann. Report), Registration of Births, Deaths, and Marriages.*

Registration of Deeds, or Enrolment, is necessary in certain cases and for certain purposes, e.g. in register cos. (*see REGISTRATION OF TITLE*); in the case of gifts to charities (*see MORTMAIN and CHARITIES*); barring all entail (*see DNTAIL and ESTATE*); bargain and sale of freeholds (i.e. under the Statute of Enrolments of 1535, which was aimed at secret conveyances); a mode of conveyance which was superseded by a simple release in 1841, which mode was in its turn replaced by a more deed of grant (*see GRANT*); and in the case of certain rent-charges. A rent-charge created otherwise than by will or marriage-settlement must, since the passing of the Judgments Act, 1855, be registered; by that Act the registration was effected in the Central Office; but by the Land Charges Act, 1900, the registration must be in the Land Registry. Unless registered a rent-charge cannot prevail against subsequent purchasers or creditors without notice (*see NOTICE, EQUITABLE AND JUDICIAL*), though it will prevail against the trustee in bankruptcy of the owner of the rent-charge. *See also LAND LAWS.*

Registration of Title. The official Land Registry was estab., as the result of a recommendation of a royal commission, by an Act passed in 1862. The purpose of the Act was to simplify and lessen the cost of dealings in land by establishing a state register of landowners who voluntarily submitted the titles to their land for examination and approval by the registrar on behalf of the state. The registry was reformed by the Land Transfer Act, 1875, which, however, continued the voluntary basis of the system. The Land Transfer Act of 1897 introduced the principle of compulsory registration, and various orders in council under that Act between 1895 and 1902 made the system compulsory on sale in the administrative co. of London. By further orders of more recent years registration has been made compulsory in certain prov. tns., and in 1936 in the administrative co. of Middlesex. The Land Registration Act, 1925, consolidated the previous Acts incorporating such changes as experience had shown to be necessary. The system shows that the machinery for the purchases and sale of land is assimilated to that for stocks and shares. Simple forms, analogous to those used on transfers of stocks and shares, are provided. The cost of buying, selling, or mortgaging registered land is much less than the cost in the case of unregistered land. It is open to any co. council or council of a co. bor. to apply to the Privy Council for an order making registration of title compulsory in its area.

Titles may be officially examined and registered as (1) absolute, (2) qualified, and (3) possessory. An absolute title is one that cannot be disputed, it being good against all the world, except register-encumbrancers and beneficiaries with trustees. An absolute title, granted by the Land Registry, is guaranteed by the state. A qualified title is one that is subject to other estates or interest actually

specified in the register. A possessory or 'holding' title is subject to all adverse or derogatory estates (if any), but it can be converted into an absolute title at any time if the registrar thinks fit. To so convert a possessory title, the registrar must investigate the title, and advertise for possible objectors to lodge their objections within two months. A possessory title six years old is comparatively easy of conversion into an absolute title. The 'register' at the Land Registry consists of three divs.: (1) the property register, in which are registered particulars and situation of land, and rights, etc., appertaining thereto; (2) proprietorship register, which specifies the nature of the title; and (3) the charges register, which states the encumbrances on registered lands. A registered proprietor may convey in the usual way (see CONVEYANCE; CONVEYANCING), or may make use of a short form prescribed by the Land Transfer Rules, the transfer being entered on the register, and a document called a land-certificate being delivered to the purchaser or transferee, and, on part-sale, to the transferor or vendor also. Apart from conveyances of freehold, which must, in a compulsory area, always be registered, all assignments of leaseholds for an unexpired residue of not less than forty years must be registered, as also all leases and under-leases granted for a like period. The fees payable for registration vary from 6d., where the value of the consideration for the sale does not exceed £5, to £1 13s., where the value exceeds £275 but does not exceed £300, an additional 5s. being payable for each £60 over £300. The Land Registry is in Lincoln's Inn Fields, London, W.C.

Registration of Voters, see under ELECTIONS.

Regium Donum, sum of £1200 per annum granted by William III. to the Presbyterian Church of Ireland in consideration of the active aid given him against James II. It was finally abolished in 1871, compensation being granted to those ministers who had a claim on the fund.

Regius Professor, holder of a univ. professorship founded by a king. In 1546 Henry VIII. founded chairs of Heb., Gk., divinity, medicine, and civil law at Oxford, and chairs of Gk., Heb., divinity, hist., civil law, and physics at Cambridge. The chair of modern hist. at Oxford was founded by George I. in 1724.

Regnal Year, Brit. method of dating Acts of Parliament. A sovereign's R. Y. begins on the anniversary of his accession, e.g. R. Y. 1. of King George VI. commenced on Dec. 12, 1936. Acts passed in a calendar year containing more than one R. Y. are dated by all, e.g. legislation of 1910 is dated 10 Edward VII. and 1 George V. See also under ACT (ACT OF PARLIAMENT).

Regnard, Jean François (1655-1709), Fr. dramatist, b. in Paris. In 1678, while on his way from Italy to France, he was captured by corsairs and kept as a slave in Algiers, an experience which he describes in his novel, *La Provençale* (1731). Later he travelled very widely, and it was

not until 1696 that he produced his first great comedy, *Le Joueur*, at the Théâtre Français, followed by *Le Distrait* (1697); *Démocrite* (1700); *Les Folies amoureuses* (1704); *Les Ménechmes* (1705); and his masterpiece, *Le Légataire universel* (1708), which gave him rank as second only to Molière, though his work lacked the depth which made Molière's so outstanding. An ed. of his works was pub. in 6 vols., 1819-1820. See F. Gaillet, *Le Drame en France au XVIII^{ème} siècle*, 1910.

Regnault, Henri (1843-71), Fr. painter, b. in Paris. He travelled in Italy, Spain, Morocco, and painted, besides portraits, scenes from oriental life, subjects inspired by episodes in Fr. hist., particularly of a martial character. See lives by H. Cuzalis, 1872, and R. Marx, 1886.

Regnault, Henri Victor (1810-78), Fr. chemist and physicist, b. at Aix-la-Chapelle. He studied chem. under Liebig, became a prof. at Lyons, and in 1841 prof. of physics at the Collège de France. His discoveries in organic chem. won him election to the Academy of Sciences, and he became director of the imperial porcelain manufactory of Sèvres. It is famed for his researches in connection with specific heat and expansion of gases. He wrote largely on chemical and physical subjects, chiefly for scientific periodicals. See A. Dumas, *Éloge historique de Henri Victor Regnault*, 1881.

Régnier, Henri François Joseph de (1864-1936), Fr. poet and novelist, b. at Honfleur (Calvados). He studied law in Paris. In the eighties R. appeared as a symbolist poet, beginning with *Les Lendemains* (1885). Other vols. were *Les Médailles d'argiles* (1900) and *Vestigia flammæ* (1921). His novels include *La Canne de Jaspe* (1895); *La Double Matresse* (1900); *Les Vacances d'un jeune homme sage* (1903); *La Peur de l'amour* (1907); *L'Amphibène* (1912); *L'Illusion héroïque de Tito Russi* (1916); *La Pêcheresse* (1920); *L'Escapade* (1926); and *L'Allana ou la vie renitienne* (1929). His collected works were pub. 1921-31. See study by R. Honnert, 1923.

Regnier, Mathurin (1573-1613), Fr. poet, b. at Chartres. He took holy orders, and eventually was made a canon of Chartres Cathedral. His works (1608-1612), which are chiefly satires, are characterized by the absence of personal reference, and by their easy style. They have been collected and ed. by E. Courbet (1875) and J. Plattard (1930). See study by J. Vianey, 1896.

Regnitz, riv. of Bavaria, Germany, which joins the Main at Bamberg. The Zenn, Aisch, Aurach, and Grudlach are among its tribs. Length 130 m. The lower course is navigable.

Regrating, old common law offence in England, consisting of buying 'corn and other victuals' and scheming to raise the price artificially. 'Forestalling' (q.v.) and 'engrossing' (q.v.) are very similar in nature. The old penalties were abolished in 1844 (7 and 8 Vict. c. 24).

Regular Canons, see CANON.

Regulation, form of delegated, subsidiary or secondary legislation, which

may be exercised by gov. depts. directly under the authority of a statute, or indirectly under like authority. There is little, if any, substantial difference between rules and Rs., special orders, and orders. There is a vague departmental understanding that rules and Rs. are intended to be of general application throughout the kingdom, whereas orders (prerogative orders and statutory orders) are of limited application to specific places, persons, or classes of persons, e.g. Housing Orders or Tn. Planning Orders. The distinction, however, is not uniform. Thus, under the Poor Law Acts and some of the earlier Housing Acts, the dept. concerned made 'orders' of universal application, and under the Public Health Act, 1875, power was given to make regulations regarding infectious diseases, but orders with regard to the qualifications and duties of medical officers of health. The inconvenience in practice is one of form rather than of substance. Both, however, are challengeable in the courts, though whether for a specified period or at all times is not clear. Both the Defence of the Realm Act, 1914, and the Emergency Powers Act, 1939, endowed the executive with the necessary authority to issue Rs. for the purpose, or better realisation of the purpose, of ordering the detention of dangerous persons in wartime. In the course of both world wars the action of the executive was unsuccessfully called in question before the House of Lords, in 1917 in the case of *Zadig*, and in 1941 in the case of *Liversidge v. Anderson*. See H. G. Hanbury, *English Courts of Law*, 1944, and C. K. Allen, *Law and Orders*, 1945.

Regulus, Marcus Atilius (d. c. 250 B.C.), Rom. consul 267 B.C. In 256 he was consul a second time with Lucius Manlius Vulso Longus. The two consuls defeated the Carthaginian fleet, and afterwards landed in Africa with a large force. They first met with great and striking success, but in 255 R. was defeated and taken prisoner. Five years later the Carthaginians sent an embassy to Rome to solicit peace. They allowed R. to accompany the ambas. on the promise that he would return to Carthage if their proposals were declined. He dissuaded the senate from assenting to a peace, and returning to Carthage he was put to death with torture.

Regulus, see GOLDEN-CRESTED WREN.

Regulus (metallurgical product), see under MATTE.

Regulus (star), see under LEO.

Rehoboam (Heb. *Rehobo* 'am, 1 Kings xiv. 21, 'the people is enlarged'), son and successor of Solomon (q.v.). His mother was Na'amah, an Ammonite princess. R. ascended the throne c. 930 B.C. at the age of forty-one, and reigned seventeen years. He was received as king by the whole nation, but his title, though recognised in the cap., Jerusalem, seemed insecure without the formal adhesion of the other tribes. An assembly was summoned at Shechem, the most revered site among the N. tribes, but instead of adopting the wise and conciliatory language

recommended by the older counsellors of Solomon, in order to placate the discontent which had been excited by the burdens (high taxation and forced labour) imposed during his father's reign, R. followed the advice of the young and violent. The N. tribes probably had resolved to break away whatever happened. They had already recalled Jerobo 'am to act as their leader (Jerobo 'am had rebelled against Solomon, but when summoned to Jerusalem, probably in order to be arrested and sentenced to death, he fled to Egypt, where he found asylum at the court of Sheshonk I., or Shishak). Jerobo 'am certainly would not have renounced his claims to the kingdom even if the demands had been accepted. However, R.'s most insolent and tyrannical reply to the representations of the N. tribes hastened the div. of the kingdom. The N. tribes drew off in resentment, stoned the officer, Adoram (Adonoram), who was sent to make terms with the ten tribes, and made Jerobo 'am their king. Thus the national union was dissolved; only the tribes of Judah and Benjamin remained loyal to the dynasty of David. Continual wars prevailed between the two petty kingdoms. This strife provided an opportunity for Shishak to invade Palestine in R.'s fifth year (1 Kings vi. 25). He took Jerusalem and removed from the temple and the palace their golden treasures. This campaign was memorialised in an Egyptian inscribed relief on a wall at Karnak: the god Amun leads forward by cords rows of 156 Heb. captives, each of whom symbolises a different Palestinian tn. which Sheshonk I. claims to have taken. R. seems to have been an altogether strong character. He fortified the road from Jerusalem through Hebron to Gaza, and built or restored many fortresses (2 Chron. xi. 5-12). He was succeeded by his son Abijah or Abijam.

Rehoboth, dist. and tn. in the protectorate of S.W. Africa. The pop. of the dist., called the Bastards, are half-caste Hottentot-Europeans. Since 1924 the dist. has been governed by the Bastard Administration; previously it had native government. Cattle-breeding is carried on and gold is mined. Pop. (dist.) 5000.

Reichenau: 1. Vil. of Saxony, Germany, 7 m. E. of Zittau. Pop. 7100. 2. Vil. of Lower Austria, 46 m. N.N.E. of Graz, much frequented as a summer resort. Pop. 4700. 3. Is. on Lake Constance. Since 1803 it has been a part of Germany. R. contains three small vils., Oberzell, Mittelzell, and Unterzell. Its steep, rugged coastline made it an easy position to defend, and it became a Benedictine monastic settlement in Carolingian times. With Fulda and St. Gall, it was one of the most important centres of Ger. culture in the early Middle Ages. The minster of St. Mary and Mark, in Mittelzell, founded in 813, contains much tenth- and eleventh-century work, while the series of frescoes in St. George's Church, in Oberzell, which belong to the same period, are among the finest in Europe. The monks of R. were famous for their illuminated MSS., which

derived some of their inspiration from St. Gall but show, like the rest of R.'s art, distinctive traces of Byzantine influence. Pop. 2600. *See* K. Gröber, *Reichenauer Kunst*, 1922; W. Gernsheim, *Die Buchmalerei der Reichenau*, 1936; and K. Beyerle, *Bischof Perminius und die Gründung der Abteien Murbach und Reichenau*, 1947.

Reichenbach, Karl, Baron von (1788-1869), Ger. scientist, b. at Stuttgart. The first iron foundries and charcoal furnaces in Bavaria were estab. by R., who discovered paraffin in 1830 and creosote two years later. He also studied animal magnetism.

Reichenbach: 1. Tn. of Saxony, Germany, 11 m. S.W. of Zwickau. Its chief industries are the spinning of wool and dyeing; it has also machine works and factories for woollen goods. Pop. 32,000. 2. Tn. in Poland, since 1945 known as Dzierżonów. It was formerly in the Prussian prov. of Silesia. R. is 31 m. S.W. of Wrocław (Breslau). Its chief manufs. are carriages, textile goods, and beer. Pop. 16,500. 3. Riv. in the canton of Bern, Switzerland, having its source in the Great Scheldegg. Its confluence with the Aar is opposite Meringen. Its course is interrupted by waterfalls, in some cases hundreds of feet in descent.

Reichenberg (Czech *Liberice*), tn. of Bohemia, Czechoslovakia, 87 m. N.E. of Prague. Its chief buildings are an industrial museum and the palace of Count Clam-Gallas. Its chief manuf. is that of cloth. Pop. 52,700.

Reichenhall, tn. of Bavaria, Germany, 8 m. S.W. of Salzburg. It is picturesquely situated, and is much visited on account of its saline springs. The chief export is salt. Pop. 14,500.

Reichsbank, *see* BANKS AND BANKING, Germany.

Reichsrat, from 1919 to 1945 Ger. federal chamber, representing the states. It replaced Bismarck's *Bundesrat*, but held less power, its functions being largely advisory. The word has also been used, at different times, of various constitutional bodies in Denmark, Sweden, tsarist Russia, the Austrian Empire, and Bavaria.

Reichstadt, Napoleon Francis Joseph, *see* NAPOLEON II.

Reichstag (Ger. 'Day of the Empire'), former name for the Ger. legislature, derived from informal, intermittent meetings of nobles and estates, called for a specific day, first by Frankish rulers and then by Ger. emperors. In 1867 the R. was re-estab. as an elected parliament for the N. Ger. Confederation, and in 1871 for the Ger. Empire. It exercised legislative power with the Bundesrat (q.v.), under the emperor's prerogatives. In 1919 the R. gained supreme power. It was elected by universal suffrage under a system of proportional representation. The Bundesrat had disappeared, and its successor, the Reichsrat (q.v.), exercised only curtailed powers. The National-Socialist regime preserved the R. in name, but Hitler eliminated opposition from that elected in 1933, and for later elections

only names of National Socialists were submitted. Nominated members of the R. were added occasionally to represent annexed terrs. By passing the Enabling Act (1933) the R. voted its own virtual elimination. After this it was convened only to hear declarations of national policy made from time to time by Hitler, though it was supposed to have advisory functions.

In 1919 representative government, under Brit., Amer., and Fr. supervision, was restored in W. Germany, and elections were held. This legislature, however, was called the Bundestag. *See also* under GERMANY, *History*.

Reichstag Fire, *see* under GERMANY, *History*; NATIONAL SOCIALISM.

Reid, Sir George (1841-1913), Scottish artist, b. at Aberdeen and studied under Yvon at Paris and Mollinger at Utrecht, and in 1872 worked with Josef Israels at The Hague. He painted landscapes, e.g. 'Whins in Bloom,' and flower-pieces, e.g. 'Roses,' and also executed studies in black and white; but his forte was portraits, his first success in this direction being his likeness of George MacDonald in 1867. Other portraits are: Sir John Millais, James Anthony Froude, the Marquess of Tweeddale, and Sir Wm. Henderson. He was president of the Royal Scottish Academy, 1891-1902.

Reid, Mayne, originally Thomas Mayne Reid (1818-83), Brit. novelist, b. at Ballyronney, N. Ireland. In 1840 he emigrated to the U.S.A. There he had an adventurous and varied career. He was at one time a journalist, but in 1846 he obtained a commission in the New York volunteers, and took an active and distinguished part in the Mexican war. He wrote in 1848 his first novel, *The Rifle Rangers*, which he pub. after his arrival in London two years later. He wrote a succession of tales of adventure which were long popular with boy readers, among them *The Sculp Hunters* (1851) and *The Headless Horseman* (1866).

Reid, Sir Robert Threshie, *see* LORE-BURN, EARL.

Reid, Thomas (1710-96), Scottish philosopher, b. at Strachan. He graduated from Marischal College, Aberdeen, in 1726, and in 1733-36 acted as college librarian. In 1737 he was presented to the living of New Machar, near Aberdeen, and having turned his attention to philosophy accepted the chair in that faculty at Marischal College in 1751. While here he pub. his *Inquiry into the Human Mind on the Principles of Common Sense* (1762) as an answer to Hume, and in 1764 was appointed prof. of moral philosophy at Glasgow, succeeding Adam Smith. Here he remained till his death, but he retired from the active duties of his professorship in 1780. His essays on the *Intellectual Powers of Man* appeared in 1785, and their ethical complement—the essays on the *Active Powers of the Human Mind*—in 1788. He also wrote an account of Aristotle's *Logic* for Kames's *Sketches of the History of Man*. R. is the leading representative of the school of common sense, by which phrase he meant the

beliefs common to rational beings as such, and not vulgar opinion. His most important doctrine is contained in his *Inquiry*, viz. that belief in an external world is intuitive or immediate. See lives by A. D. Fraser, 1898, and K. Peters, 1900, and ed. of the *Essays*, ed. by A. D. Woozley, 1911.

Reigate, municipal bor. and one-time mkt. tn. in Surrey, England, 22 m. S. of London. Its chief building of interest is the church, the burial-place of Lord Howard of Effingham. The grammar school was founded in 1675. It grew up round a castle, held first by the Warenne family and then by the earls of Arundel. This was destroyed in the Civil war. The old tn. hall, formerly on Market House, is now the public library. There are fuller's earth works, hearthstone mines, and an essence factory. Pop. 14,100.

Reign of Terror (1793), see FRANCE, *History*.

Reikiavik, or **Reikjavik**, see REYKJAVIK. **Relly**, Sir Charles Herbert (1874-1918), Brit. architect, b. in London, and educated at Merchant Taylors' School and Queen's College, Cambridge. He was prof. of architecture at Liverpool Univ. from 1904 to 1934. In 1909 he was elected to the council of R.I.B.A. and was architectural editor of *Country Life* from 1922. Among the buildings he designed were the Liverpool Students' Union and Devonshire House, Piccadilly. He was one of the early advocates of 'play-trees' for children. It was decided in 1947 that an ann. R. scholarship in architecture should be offered by Liverpool Univ. It was knighted in 1911. His autobiography, *Scaffold in the Sky*, was pub. in 1938.

Reims, see RHILM.

Reimun, see RAMOTH-GILEAD.

Reinach, Joseph (1856-1921), Fr.-Jewish politician and historian; he was b. in Paris and became a barrister. He joined the *Republique française* and supported Gambetta, to whom he became secretary in 1881. In 1889 he became a member of the Chamber, in which he sat at intervals till 1914. R. was a champion of Dreyfus, being largely instrumental in securing justice for him. His account of the case (1901-11), in the *History of the Dreyfus Case* (7 vols.), is a careful and interesting work, though strongly partisan.

Reinacher, Eduard (b. 1892), Ger. poet, b. in Strasburg. Many of his subjects are taken from legend and myth, and his lyrics of Al-ace show a deep knowledge and love of the old Alsatian customs, traditions, and folklore. R.'s poetry is mystical, pictorial, emotional; he belongs to the school of the late Ger. Romantic poets. His finest pubs. include *Elsasser Idyllen und Elegien* (1925) and *Silberspane* (1930).

Reincarnation, or **Metempsychosis**, doctrine according to which the soul of a human being enters at death into another body, whether of man or beast. It is impossible to determine among what people the idea of R. originated, but it certainly dates from the remotest antiquity, and seems to form part of all

primitive religions. It enters into all the religious and philosophical systems of the E., and is associated with the idea of retribution for good and evil. It probably arose in the attempt to find a cure for evil and to explain its existence. If the cure is to be found in a future immortality, the cause may be sought in previous existence whose sins are punished by present suffering. Thus, the goal of all systems which admit R. is the termination of the indefinite cycle of rebirth and absorption in the divine. In the W., although the belief was widespread among the ancients, R. appears to have had no spontaneous and popular origin, being rather a tenet of philosophical or mystical schools. It was a central belief of the Pythagoreans and Orphics, having been derived by them ultimately perhaps from Egypt or Chaldea. It passed into Platonism, and traces of it appear in the mixed eschatology of Virgil. R. is irreconcilable with Christian theology, nor has it any place in the mosaic scriptures. Some scholars, however, have detected the influence of R. (inherited from Babylonians) in the post-exilic literature of the Jews. See also BUDDHISM; ESCHATOLOGY; HINDUISM; NIRVANA. See E. Abel, *Fragments Orphica*, 1885; J. Harrison, *Prolegomena to the Study of Greek Religion*, 1908; and W. Lutoslawski, *Pre-existence and Reincarnation*, 1924.

Reindeer, or *Rangifer tarandus*, species of deer, the only one which has been domesticated. The domesticated animal is much smaller than the wild. Antlers are produced in both sexes, being cast in



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March or early April; those of the female are shorter and more slender. The hoofs are broad and rounded, and the 'pettitoes', which in other deer except elk are small and evanescent, are well developed, being of great service to the animal in walking over snow and bare ground. The colour varies considerably, but is commonly a mouse gray tinged with brown, becoming lighter towards winter, with white on the belly, and in the bucks a thick fringe

under the throat and neck. The domestication of Re. dates from a remote period, and the Laplanders utilise them not only as beasts of burden, which will drag a sleigh weighing 300 lb. 100 m. a day over the snow, but also to produce milk, meat, clothing, and tents. In domestication they suffer a great deal from anthrax, and also from the attacks of flies, which often destroy the value of the skin. They are capable of great endurance, and can swim long distances in ice-cold water; their sense of smell is unusually acute. In summer they feed on coarse grasses, herbs, mosses, and lichens; in winter a special lichen known as *Re. moss* (*q.v.*) forms their prin. food. Their range was formerly very extensive, and in the Post-Glacial Pleistocene period they were abundant in S. France. They are now confined to the most northerly regions of Europe and Asia, in many parts of which, including Norway, the wild herds are stalked. It is still unsettled whether the N. Amer. and Newfoundland caribous are distinct species or only varieties of the R. The barren-ground caribou makes very extensive migrations in huge herds and penetrates far into the Arctic Circle. The woodland caribou occurs in some of the denser Canadian forests and in a few forests of the United States. The Newfoundland caribou has been much massacred in the past, but is now protected. *See also under LAPLAND.*

Reindeer, lake in Saskatchewan, Canada, 120 m. long by 25 m. broad; it has an outlet through the Reindeer R. to Churchill R.

Reindeer Moss, a finely branched lichen, *Cladonia rangiferina*, occurring on moors in America and N. Europe. It constitutes the prin. food of the reindeer.

Reineke Fuchs, or **Reinhart Vuhs**, or **Fuchs**, *see* REYNARD THE FOX; and *also* FABLE.

Reinforced Concrete was invented in France about the year 1850, and is now one of the most important materials used in building construction. It is a combination of cement concrete (which can resist very high compressive forces, but has little resistance to the tensile, shearing, twisting, and other forces to which the parts of a structure are subjected) and steel, which has a high resistance to tensile and other forces imposed on structures by their own weight, by the loads they carry, and by other forces, such as the wind. R. C. is designed so that, generally, all the compressive forces are resisted by the concrete and all the other forces by the steel reinforcement. The reinforcement is generally in the form of mild steel round bars up to 2 in. in diameter, but square, indented, and twisted bars, and also high-tensile steel bars, are used. An advantage of the steel reinforcement is that it also resists the tensile stresses induced in the concrete when the latter shrinks during the setting and hardening process, and when it expands and contracts with changes of temp. This is possible because concrete and steel expand and contract at the same rate with changes of temp. A further advantage of R. C. is its resist-

ance to fire. In the case of structural steel frames the steel has to be encased in concrete to protect it from fire, and this concrete casing serves no other purpose. The use of reinforcement has made possible the erection of large cantilevers, thin domes, long spans (the longest arch span so far built in R. C. is in a bridge in Sweden and is 865 ft. long), and other shapes that would be impossible or uneconomical in any other material. It has also made possible R. C. beams, transmission-line poles, lamp and fence posts, and many other products which can be made in a factory away from the site of erection, with a consequent reduction of the amount of labour required on the site.

Prestressed Concrete.—A more recent development, which was first conceived on the Continent in the first decade of the present century, is known as prestressed concrete, the use of which has made rapid progress in the past ten years. It has been stated that concrete is weak in tension, that is in its resistance to forces that tend to stretch it; if a beam, say, is loaded at mid span tensile stresses will be induced in its underside because when a beam is bent its underside is lengthened, and its top shortened. If, however, pressure is applied to one or both ends of the beam so that it is in compression throughout its length it will have a greater resistance to bending, and a friable material, or even separate pieces arranged to form a beam, will then carry a load. This can be proved by arranging half-a-dozen bricks in a row and lifting them by pressing with the hands on the end bricks. Steel, on the other hand, can be stretched and lengthened within its elastic limit, and when the stretching force is removed it will return to its original length. These properties are taken advantage of in prestressed concrete by incorporating in the concrete steel wires (generally about one-fifth of an inch in diameter) which are stretched and kept in a state of tension throughout the life of the beam. One method is to place the wires in a mould and stretch them with a jack, fix the ends of the wires so that they remain in the stretched state when the jack is removed, and then place the concrete. In a week or so the bond between the hardened concrete and the steel is sufficient to prevent the wires from slipping, and when the fixings are removed the concrete remains in a state of compression because the wires are striving to regain their original shorter length. In another method longitudinal holes are formed in the concrete to take the wires, which are not in contact with the concrete. Instead they are, after stretching, wedged in steel plates covering the ends of the beam, so that the wires pull on the end plates, and so keep the concrete in compression. *See* G. Magnel, *Prestressed Concrete*, 1918; A. L. I. Baker, *Reinforced Concrete*, 1919; and Oscar Faber, *Reinforced Concrete Simply Explained*, 1930.

Reinhardt, Max (1873-1913), Austrian-born Amer. theatrical director, b. at Baden, near Vienna, of Jewish stock, his real name being Goldmann. His real

bank clerk, but in 1894 appeared on the stage of the Deutsches Theater, Berlin, of which he became director—after a period (beginning 1903) of innovating management at the Neues Theater. His character acting was outstanding, but it was as a theatrical manager that he is remembered. He employed the 'apron stage' and devices even more striking to establish intimacy with the audience. His productions of Shakespeare and Shaw, Molière, Strindberg, Ibsen, Gorky, etc., occasioned his being invited to stage these authors in foreign cities. His purpose was to increase the resources of the stage and to widen its appeal by every possible means; but if he was a great showman, he was an erudite one. His theatre became a clearing-house for ideas and tendencies from every country, and its importance from that standpoint before the Second World War was undeniable. His most remarkable experiment, perhaps, was *The Miracle*, a medieval pageant enacted with a background which took in both audience and players—an experiment which was followed at Covent Garden in the presentation of *Edipus Rex*, in which frenzied torch-bearers ran through the auditorium to the great brazen door of the palace. In *Edipus Rex* a play without words, the plot was conveyed by music, costume, lighting, and decoration. R. left Germany in 1933, in which year he supervised an open-air production of *A Midsummer Night's Dream* at Oxford, where the honorary degree of D.C.L. was conferred upon him. He went to the U.S.A. in 1935 and became an American citizen in 1940.

Reinkens, Joseph Hubert (1821-96), first Old Catholic bishop, *b.* at Birtscheid, near Aachen. In 1870 he joined Dollinger in the Old Catholic movement and opposition to the doctrine of papal infallibility, and in 1873 was consecrated bishop of the Old Catholics in Germany, with headquarters at Bonn. See life by J. M. Reinkens, 1906.

Reinsurance. When an insurance broker, company, or corporation has accepted a risk, which in the interest of good business is much too heavy to be carried with safety, a way is found of spreading the risk by insuring part of it with others. This is known as R. It is principally of two kinds: (1) Facultative; (2) Treaty. Facultative R. differs from treaty R. in the fact that by the former method the party with whom the R. has been effected has the power to accept or decline each risk offered by the ceding company. Treaty R. is, on the other hand, carried out under a contract which stipulates that the ceding company is bound to cede and the reinsurer is bound to accept an agreed proportion of the risks undertaken by the ceding company. The amount of business done in R. is enormous, and it is to the credit of Brit. insurance companies in general that much of the risk taken by foreign insurance companies is reinsured with them.

Reith, John Charles Walsham, first Baron Reith of Stonehaven (b. 1889), Brit. administrator, *b.* at Stonehaven, and

educated at Gresham's School, Holt, and at the Royal Technical College, Glasgow, later becoming an engineer. He became the first general manager of the B.B.C. in 1922, and was its director-general from 1927 to 1938. He rendered great service in developing Brit. broadcasting, and insisted upon a high intellectual and spiritual standard for programmes. In 1947 a series of ann. broadcast lectures was established, named after R. He left the B.B.C. to become chairman of Imperial Airways, and was the first chairman of the Brit. Overseas Airways Corporation. R. became M.P. for Southampton in 1940 and was successively minister of information, minister of transport, and minister of works and buildings (later works and planning). For a time he was director of combined operations, material dept., at the Admiralty. In 1945 he became chairman of the Commonwealth Telecommunications Conference. He was knighted in 1927 and created a peer in 1940. He pub. a book of memoirs in 1948 and an autobiography, *Into the Wind*, in 1950.

Reitz, Deneys (1882-1944), S. African soldier, politician, and author, *b.* in Bloemfontein, son of the president of the Orange Free State at the outbreak of the S. African war. He fought against Britain in that war and afterwards went into voluntary exile in Madagascar, but was induced by Gen. Smuts to go back to S. Africa, where he qualified in law. After his return he forsook his anti-Brit. attitude, and in the First World War he fought with the Union forces in Ger. E. and W. Africa; volunteered for service with the Brit. forces in 1917 and took a commission, being severely wounded and mentioned in dispatches. In 1920 he was elected to the Union Parliament as a member of the S. African party. He was minister of lands (when he was influential in promoting the estab. of the Kruger National Park), 1933; minister of agriculture and forestry, 1935; minister of mines, 1938; and in 1939, after the Smuts-Hertzog break on the war issue, became deputy Prime Minister (till 1943) and minister for native affairs. In 1942 he was appointed S. African high commissioner in London. He did much for Afrikaans as a literary language and wrote, among other books, *Commando: a Boer Journal of the Boer War* (1929); *Trekking On* (1933); and *No Outspan* (1943). His wife, a daughter of Dr. Claude Wright, of Wynberg, Cape Prov., became the first woman member of the Union Parliament.

Rejuvenation, see under CLAN.

Relapsing Fever, acute infectious disease occurring among famine-stricken people; other names applied to the same condition are famine fever, seven-day fever, and bilious R. F. It is caused by a specific micro-organism, *Spirillum obermueri*, which is found in large numbers in the spleen. The period of incubation is from five to seven days; the fever starts with severe pains in the back and limbs, rigors, and a high temp. (105°-107°). Delirium, jaundice, enlargement of the spleen, profuse sweating, and intense thirst are

characteristic of the acute stage. These symptoms continue for about a week, when they cease by crisis. There is an intermission for about a week, during which time no spirilla are found in the blood. Another paroxysm then commonly occurs, which may not be of such severity as the first. A third and fourth attack with similar intermissions may occur. Recovery is the general ending, the mortality being under 5 per cent. The disease only prevails among overcrowded and badly nourished communities, and occasionally occurs in the thickly populated dists. of E. Europe and of India and China. An epidemic occurred in Ireland in connection with the famine of 1826. The treatment is similar to that adopted in typhus; light but nourishing food must be given, and as the disease is caused by poor vitality the patient's strength must be built up. The disease is probably transmitted by lice, so that bodily cleanliness is important in the treatment and prevention.

Relations, Maintenance of, see under POOR LAWS; PARENT AND CHILD; HUSBAND AND WIFE.

Relativity. The theory of R. is the theory of the statement of the general laws of physics in a manner that is common to all observers under any conditions. An adult is likely to have a lively recollection of the intellectual difficulties of the schoolboy when confronted with the mixture of Euclidean geometry and Newtonian dynamics that forms the basis of pre-relativity physics, or the physics that is now taught in schools. Appeals to the everyday experience of the pupil and to practical experiences in the form of demonstrations are necessary in order to develop the imaginative ideas that are required for a proper appreciation of pre-relativity physics, which is solely concerned with the point of view of the everyday observer. The judgments formed by such an observer are to a large extent subjective, and it is the business of the theory of R. to eliminate the subjective element from physics and to substitute a science that is objective, in the sense that the laws shall be common to all observers. The difficulties that the theory of R. presents to an adult trained in the ways of pre-relativity physics are twofold. First he must be prepared for a fundamental change in his imagination; at the same time the necessary substitution of Riemannian geometry for Euclidean geometry and of Einstein's geometry for Newton's dynamics demands a specialised knowledge of higher mathematics. It is possible, however, to indicate in a non-mathematical article some of the oddities of pre-relativity physics and to show the general line of advance of the theory of R.

The Michelson-Morley Experiment (q.v.). The real importance of this experiment is that it indirectly led to the theory of R. The nineteenth-century physicist postulated the existence of an absolute and all-pervading ether as the medium through which light travels. The earth, like other bodies, was supposed to pass freely through this ether. In other words, the

motion of the earth relative to the ether created the effect of an 'ether wind.' Hence a terrestrial observer should find that light travels faster with this 'wind' than against it, and faster across the ether wind than against it. The details of this experimental test are given in the appropriate article and a diagram of the apparatus used is given in the article on SPECTRUM. It is sufficient to note that the test was sufficiently delicate to have measured this expected difference in the velocity of light relative to the terrestrial observer according as the light travelled in the direction of the earth's motion or at right angles to that direction. The result of the experiment was negative, i.e. no such difference was detected. The experiment was repeated in 1887 with improved apparatus, but the same result was obtained. Lorentz (q.v.) and Fitzgerald developed a hypothesis to account for the surprising result of the experiment. This hypothesis adopted as its fundamental assumption that a measuring rod or body in motion suffers a contraction in length in the direction of its motion, and that the amount of the contraction is just sufficient to account for the negative result of the Michelson-Morley experiment. This ingenious assumption renders all attempts such as were made by Michelson and Morley abortive, since the measuring rods themselves are contracted in the direction of the earth's motion. The arbitrary assumption of Lorentz and Fitzgerald was found to be justified when Einstein developed the Special Theory of R. in 1905, but the important conclusions that can be made directly from the Michelson-Morley experiment are (1) that no observer can detect his motion through the medium that is the vehicle for the transmission of light; (2) that the velocity of light through this medium is independent of the motion of its source and has the same value relative to every observer. Einstein's Special Theory of R. is really a theory based on these two statements. A few examples will show what curious results follow from these facts. The contraction that takes place in the direction of motion of a body is exceedingly small for the ordinary velocities to which we are accustomed. A man, however, who was travelling with a velocity of 161,000 m. per sec., for example, relative to an observer would appear to contract to one-half of his usual dimensions in the direction of motion. If he were travelling vertically relative to the observer his height would appear to be halved, if he were travelling in a magic train his height would appear normal but his width would be halved so that he would present a curious appearance similar to the image of a man reflected in a cylindrical mirror. At the same time if the traveller measured his height or breadth he would discover none of these changes, since his measuring rods would share the contraction. He would, however, comment on the strange appearance of the observer who, forgetting his Burns, might be congratulating himself on his own good fortune. This weird

appearance, presented by each of the men to one another, is no illusion. A photographic plate operating in a camera at the necessary speed for such a photograph would give a permanent confirmation of the contraction.

Another result of the theory is that no body can travel with a speed greater than that of light, and a man travelling in such a magic train moving with that speed relative to an observer would be a two-dimensional being as far as the observer is concerned, for his height or breadth (as the case may be) would appear to contract to nothing. That the velocity of light has the same value, namely, 186,000 m. per sec. (the most recent figures are 186,271 m. per sec.), relative to every observer, leads to further strange results. If a policeman flashes his torch in the faces of suspected burglars, some of whom take to their heels while the rest drive off in a high-powered car, the light-waves from the lamp will be 186,000 m. from the policeman and from each of the sev. burglars after one second measured by their individual watches. It is not surprising therefore to learn that the watches are affected by the motion of their owners—not through any derangement of their works, but simply by the motion of the owner relative to an observer. Eddington has given the interesting example of an aviator travelling at 161,000 m. per sec. relative to an observer. Both men are equipped with mechanically perfect chronometers. The aviator and observer each light a cigar the instant at which they pass each other. Making due allowances for the time required for light signals to pass between the two men, each would arrive at the considered judgment that his own cigar had only lasted half as long as the other's. Before leaving these strange facts, the effect of relative motion on mass must be stated, because the β -rays emitted from radioactive matter provide us with instances of bodies (i.e. electrons) moving relatively to us at speeds comparable with that of light. It is found that the mass of such an electron is considerably greater than that of an electron moving slowly relatively to the experimenter. This is a practical verification of the consequences of the special theory of R.; theoretical considerations show that the mass of a body, whose speed approached that of light relative to an observer, would tend to infinity, while at the same time an observer travelling with the electron would detect no change in its mass.

So far we have noted the unexpected results that arise because we judge phenomena from our own point of view. Similar surprises occur in other branches of science. As Bertrand Russell points out, what appears to be a solid stationary piece of rock to a human being is seen by a microscopic observer of electronic size to consist of an alarming array of electrons and protons whirling round each other at enormous speeds.

The theory also shows that if matter is converted into energy of a different kind (e.g. radiation, or the kinetic energy of

atoms and electrons produced during the disintegration of atoms of another type) the energy E released is given by the equation $E = mc^2$, where c is the velocity of light and m the mass that disappears. This equation has been confirmed in many experiments. Because c is so large the energy set free when even moderate amounts of matter are destroyed is enormous. Changes of this kind provide the energy radiated by the sun and stars and that generated in the atomic bomb (q.v.).

Pro-relativity physics serves us very well provided we shut our eyes to the possibilities of dealing with phenomena other than those we meet in everyday life. We may rest content with Euclidean geometry and Newtonian dynamics; knowing that they do serve a very useful purpose for our daily affairs and that they represent a close approximation to truth as ascertained by practical measurements. But Einstein's general theory of R. is something more than a closer approximation to truth; it demands a complete revolution in the fundamental ideas of the natural world.

Formerly space was divorced from time. The position of any object was determined by three co-ordinates and in this sense space was three-dimensional; e.g. the position of an aeroplane is given by its latitude, longitude and its height above sea level. It was believed that time was quite distinct from space in the sense that the determination of the position of the aeroplane was quite distinct from the determination of the instant at which it occupied that position. Yet, as many writers point out, if one event is simultaneous with another according to the reckoning of one observer, another observer will declare that simultaneity between the two events does not exist. Russell illustrates this fact by observing that if two brigands stationed on a railway line shoot the guard and the driver respectively of a passing train and if a man in the middle of the train hears the reports simultaneously he will judge that the two shots were simultaneous. A stationmaster, however, who is exactly half-way between the brigands will hear first the shot that killed the guard. Simultaneity, in other words, is in that case relative to the observer. The theory of R. avoids such subjective judgment by recognising that four quantities are involved in determining the position of an 'event', namely the time and the three dimensions of the place of the event. The system of geometry that is implicated in the development of the theory is four-dimensional in that sense. The position of an event is thereby determined in space-time, and space-time is non-Euclidean in its properties. The general theory of R. is concerned with the explanation of gravitation by means of the properties of a world of four-dimensional space-time. Newton's law of gravitation postulates 'action at a distance' according to the law of inverse squares in order to explain the motions of heavenly and terrestrial bodies. The very idea of 'force' is abandoned by the general theory of R. The

behaviour of the planets, stars, etc., is not due to forces emanating from other bodies in the universe, but to the special nature of the world of space-time in the neighbourhood of matter. Three verifications of Einstein's theory are well known. In the first place it accounted for a peculiarity in the behaviour of the perihellion of the orbit of the planet Mercury that could not be explained on Newton's theory, and in the second place it accounts for the observed deviation of light in its passage near a material body such as the sun. A third verification is found in the shift towards the red end in the spectra of the sun, and in particular of stars of great density—white dwarfs such as the companion of Sirius. No doubt remains that the Einstein effect is in evidence in these three cases.

At the time of writing this article it was announced that Einstein had just published his new theory on which he had been working for many years. It is called a unified field theory, and is one more step in uniting the different modes of action of the universe in a single system. The difficulty that Einstein found in linking together gravitation and electromagnetism now appears to have been surmounted, and his previous tentative efforts have attained their consummation in this latest theory, which is a set of mathematical relations describing the field set up in space and time by the action of gravitation and electromagnetism together. Of course it may be premature to speak with confidence of the new theory because at present it has not been submitted to actual physical experiment, and it will be some time before this can be done, just as his earlier theory had to wait until 1919 for the first actual verification through the solar eclipse of May 29. It is possible that Einstein will survive to see his latest theory verified, a theory which has not merely an academic interest but which is fraught with far-reaching practical results.

See A. Einstein, *Relativity* (trans. by R. W. Lawson), 1920; A. S. Eddington, *Space, Time, and Gravitation*, 1920; L. Bolton, *An Introduction to the Theory of Relativity*, 1921; C. Nordmann, *Einstein and the Universe*, 1921; B. Russell, *ABC of Relativity*, 1925; H. Dingle, *Relativity for All*, 1925, and *The Special Theory of Relativity*, 1940; C. V. Durell, *Readable Relativity*, 1928; M. Davidson, *Elements of Mathematical Astronomy, with a Brief Exposition of Relativity*, 1949; and L. R. and H. G. Lieber, *The Einstein Theory of Relativity*, 1949.

Relativity of Knowledge, doctrine which is denied in some schools of philosophy, while in others it is regarded almost as an axiom. In its higher form it is grounded upon the distinction between noumena and phenomena, between realities and things as we can perceive them. If all human knowledge is gathered from 'shadows' (to use Plato's image) it can but be relative and not absolute. Again, it is argued that since all knowledge implies a relation between the knower and the object known, the subjective element

in knowledge cannot be discounted. Every object undergoes a change in the very act of becoming an object of knowledge. On behalf of the doctrine, see Sir W. Hamilton, *Discussions* (3rd ed., 1866), and *Lectures on Metaphysics* (3rd ed., 1874); against it see H. Slidgwick, *Philosophy* (1902).

Relay (electricity). An electrical R. is simply an electro-magnetic switch which is closed or opened by an electrical current and so controls another electrical circuit. Rs. are used for many purposes, alarms of various kinds, pilot and emergency lighting of factories, offices, road traffic signals, etc. If the current to be controlled is a large one the switch part of the R. will probably be of the mercury type. This is simply a glass phial containing the switch contacts and a quantity of mercury, the mercury opening or closing the circuit as required. A typical example of an electro-magnetic R. is the emergency lighting R. in a factory. A series of lamps are distributed round the building, fed by batteries; the feeds from these batteries are controlled by a switch, this being held in the off position by a mains operated R., therefore in the event of a mains failure the battery switch is allowed to close and the emergency lights are switched on automatically without any loss of time. There is another type of R. known as the photo-electro type. The actual R. may be a thermionic tube or the photo-electro cell may actuate a valve type amplifier which in turn may operate an electro-magnetic R. This is done because the operation of this type of R. depends upon the amount of light falling on the photo-electro cell, which changes the light energy into electrical energy. The electrical current, however, is much too small to be of any practical use, and so therefore it is amplified. The sound track of a cinema is based on this type of R. The light is passed through the sound track, is received by the cell, and then amplified. The amplified currents in turn operate the loud speakers behind or below the screen.

Release, in law, valid discharge by one person of a legal right or claim against another. To be effectual a R. should be by deed (q.r.), especially where the person released gives no consideration (q.r.). The right of payment of a cheque may, however, be given up by mere surrender of the cheque itself to the drawer. Liability under a contract under seal (see CONTRACT) can only be discharged by a R. under seal. A R. given by an infant is invalid.

Relics (O.F. *relique*, Lat. *reliquiae*, from *relinquere*, to leave behind), remains of the bodies or other objects connected with holy persons, to which a religious cultus is paid. The practice is both older and more widespread than Christianity, and is found in an extreme form among Buddhists. In the early Christian Church great esteem was shown for the bodies of the martyrs, and strenuous efforts were made to recover them, as is witnessed by the remarkable epistle of the Christians of Smyrna on the death of St. Polycarp, A.D. 156. Earlier still the Eucharist

appears to have been celebrated over the tombs of the martyrs (*cf.* Rev. vi. 9). The early fathers of the Church all take the practice for granted, though there is diversity of emphasis in their explanations of the nature of the cultus. This was later explained by the medieval scholastics as a 'relative cult of *dulia*,' *dulia* being the kind of honour due to a human being, and 'relative' implying that this honour was paid only on account of the relationship of the object to the person. The enormous popularity of relics and the entirely uncritical nature of these ages led to abuses, both in the deliberate and in the unconscious multiplication of such relics, and in over-emphasis on devotion to them. Against these abuses the Reformers reacted with energy, and swept away the whole doctrine. The Rom. Church preserves both doctrine and practice, but does not in every case guarantee the authenticity of individual objects as relics.

Relict Mountains, *see under* MOUNTAINS.

Relief, feudal incident originating when fiefs were not hereditary, being sums paid to the lord by the heir before he could enter upon possession of his lands. William I. fixed the sum at 100s. or, in lieu, so many arms for each knight's fee; William II. exacted military Rs., but, in his Charter of Liberties, Henry I. enacted that Rs. should be 'just and lawful.' In the time of Henry II. the regular Rs. were 100s. for a knight's fee and £100 for a barony; these Rs. were only payable if the heir was of age; if a minor he became a ward and paid no R. Articles 2 and 3 of Magna Carta confirmed the ant. R. (Stubbs, *Select Charters*, 74, 1884). For R. organisations, *see* CHARITIES; NATIONAL ASSISTANCE ACT (1918); UNITED NATIONS RELIEF AND REHABILITATION ADMINISTRATION; and VAGRANTS.

Relief Lace, *see under* LACE.

Relief Maps, *see under* MAPS.

Reliefs, *see* BAS-RELIEFS.

Religion, derived by Cicero from *religare*, to treat carefully (*De Nat. Dierum* ii., 28) by Lactantius from *religare*, to bind together (*Instit. Div.* iv., 28), and by St. Augustine from *religere*, meaning to recover (*De Civitate Dei*, x. 3). Broadly speaking, R. may be defined as the acceptance of certain obligations towards powers higher than man himself. Thus it does not exist among those who deny the existence of anything above this material universe, nor among those who, whether they hold such beliefs or not, accept no voluntary obligations towards such powers. If the concept of R. is further analysed it will be found to contain the following. First, belief that these higher powers are of a personal nature, not merely blind forces. In the higher Rs. there is the recognition of one Divine Being, infinitely transcendent, but not uninterested in the conduct of human beings. In lower forms of R. numerous gods are admitted, though the tendency to recognise one as supreme is apparent as the scale of intelligence is improved. Second, the ascription to the Being or Beings of certain moral qualities, in virtue of which they are

pleased or displeased with the behaviour of man. The standards of moral qualities attributed to them vary enormously, but the general idea that they are the judges of right and wrong can usually be detected. Third, the idea that the deity is to be obeyed, or at least placated. If this is not done retribution follows. There is a need of assistance from the Divine Being which may be obtained on certain terms. Thus the having of good relations with the Divine is intimately bound up with man's happiness. In the lowest Rs. the favours sought and the evils avoided are only of the most material kind, e.g. good crops, victory in war, natural fecundity, etc., but in the higher Rs. it is the needs of the soul that occupy the most important place; and in the highest of all, the end of man is sought in his complete communion with the Divine Being. In Christianity this is not conceived so as to destroy personality; in Buddhism it presumes complete absorption with loss of separate identity. Fourth, in most Rs. the idea that the Divinity rewards and punishes after death. From this it will be seen that R. comprises certain ideas or beliefs, corresponding to what Christianity terms 'faith,' and that it demands certain actions, corresponding loosely to what Christianity terms 'morals.' One may also distinguish positive acts of 'worship' which embody something of the beliefs in ritual actions. Round each of these general ideas are built up a large number of practices, such as penances, prayer, healing, festivities, ritual observances, e.g. sacrifices, and a more or less developed teaching on morals and the life hereafter, comprised, when the standard of civilisation permits it, in a number of sacred books.

In antiquity and in the Middle Ages the universality of R. was taken for granted, though its forms were known to differ widely. With the discovery of the new continents, however, travellers and missionaries reported the existence of tribes who had apparently no R., e.g. the Jesuit, Baegert, gave such a report on one of the tribes in S. California in the early nineteenth century. Further investigation usually showed that such tribes had a R., but that it was a secret, not to be communicated to strangers. Moreover, some of the early travellers failed to recognise the R. of the tribes they visited because it did not correspond to their own more civilised ideas. Generally speaking it can be asserted that R. is found to be a normal constituent of human life, of which the absence is extremely rare. This is explained by the Christian hypothesis that God made man, and implanted in him the notion of his creator, and the innate tendency to worship him. Both knowledge and worship were largely corrupted in subsequent ages, and thus we find the extremely defective ideas common to primitive races. Modern research, on the other hand, has seen in the religious feeling of mankind rather an instinct of fear towards the unknown in nature which is credited with superhuman powers, and thus gradually erected into an object of worship. On this hypothesis man would

gradually outgrow R., as he mastered his fears, and, in particular, subdued the forces of nature, or at least understood the causes of natural phenomena. This theory takes no account of the permanent craving found in man for happiness in communion with the godhead—an instinct which has nothing to do with fear or the forces of nature, and is not outgrown with an increase of material welfare.

How far R. should be described as universal to-day is impossible to state, since vast areas, e.g. the U.S.S.R., are professedly atheistic, with results that are not fully known, and have not yet had time to reach their full evolution.

The origin of R. has been the subject of considerable discussion. The various theories are as follows: (1) The Christian thesis of a divine revelation of Monotheism (*q.v.*) is contained in the Bible in the book of Genesis. (2) Philosophically it is possible to reach the same conclusion by the use of reason, and Plato practically did so; but few have done this, and it cannot be held responsible for the notions of primitive tribes. (3) Nevertheless their deduction of a force behind the powers of nature, which is a personal nature, though crudely understood, is not totally false. To argue that behind the thunder was a thunderer, and behind the rain a person who sent it, though crude, is an application of the principle of causality. The primitive man asks: Who sent the rain? The philosopher asks: Who organised the universe of which the rain is a minor phenomenon? The instinctive application of the principle of causality may then be invoked as a cause of the origin of R. (4) The intuition theory supposes simply that man has an intuition of God, and of his dependence upon him. This, however, explains nothing, and leaves unexplained the fact that large numbers of individuals have little or no religious bent. Max Müller's perception theory postulated a mental faculty, which perceives the infinite, independently of either sense or reason (*Growth of Religion*, 1880). A perception of the infinite, even if granted, is hardly an adequate explanation of the origin of R., and would seem to be a philosophic notion of which primitive races are incapable. A sense of the 'numinous' is, however, an invariable part of R. (5) The animist theory (*Lat. anima*, a soul), propounded by E. B. Tylor, supposes that from dreams, etc., primitive people derived a notion of the soul; then by a confusion of ideas they transferred this soul-idea to things both living and inanimate. Thus there grew up the idea that the tremendous phenomena of nature were to be attributed to powerful spirits inhabiting the elements. (*see further under ANIMISM*). Herbert Spencer reduces R. in its origin to 'Shintoism,' or ancestor worship. He supposes that man began by worshipping his ancestors, some of whom had picturesque names, such as we find among the Red Indians, e.g. Rainbow, Mighty River, etc. Thus with the passage of time arose the worship of mighty nature spirits, whose connection with their ancestors was no

longer remembered. This change would be accelerated by the mingling of peoples with different sets of ancestors, and who would be loosely associated with their place of origin, viz. children of the valley, or of the sea. He points out that the original sacrificial offerings were things thought to be useful to the departed in their other-world existence. In exchange for them, the departed were expected to exercise their influence to help the living. Ancestor worship, however, is not R., and though extremely ancient, is a subject of its own, sometimes connected with R., sometimes not. There is no essential connection between the two (*see also ANCESTOR WORSHIP*). (6) The totem theory believes that the oldest form of R. is the totem or sacred animal or plant belonging to a tribe. The tribe is supposed to have derived its origin from this totem, and a spirit of the totem dwells in the different individuals of the species, which are therefore regarded as sacred, and deserving of veneration. By the process of war and conquest one clan would emerge as triumphant, and so its totem would be regarded as superior to all others. Thus by degrees grew up the idea of a supreme being. The totem theory, however, in addition to other defects, takes for granted the idea of superior spiritual forces, which it does not explain. In practice, too, it is found to be rather a component part of R. in primitive tribes, and would not explain their whole religious outlook (*see TOTEMISM*). (7) A theory well known to the ancients, bases R. on fear of the unknown, particularly as encountered in the mysterious forces of nature. These forces are then personified, and an attempt is made to placate them by worship and sacrifices. Thus the Rom. and Gk. philosophers explained the crude polytheism of the masses. (8) Fetish worship (*see FETTERISM*) in essence supposes that it is possible to imprison a spirit or power inside a small object, which is then carried about for protection. When it fails to give protection it is assumed that the spirit has escaped, and the object is no longer of value. The fact that this fetish worship is a component part of the R. of certain primitive tribes in no way proves that it lies at the origin of all R. As with totemism fetish worship supposes but does not explain a belief in the existence of higher powers. Only if we suppose that a lower religious concept must precede a higher one is there any reason for placing this idea at the origin of R. The tendency to suppose that lower religious ideas necessarily precede higher ones was taken for granted among scholars of the last century, but has been largely disproved by W. Schmidt in his *Ursprung der Götteridee* (Eng. trans., *Origin and Growth of Religion*, 1931).

In the nineteenth century there began the independent research into all known forms of R. This was conducted on an entirely factual basis, and sought neither to prove nor deny the claims of various religious bodies; in practice it assumed that R. could not be other than the evolution of a certain part of man's

thought. In this way emerged the study of the hist. of R.: this treats of the positive facts that go to make up the story of each R.; it deals on the one hand with the evolution of various concepts, *e.g.* of God in each religion, and of the corresponding external evolution in rites, ceremonies, sacred books, priesthood, etc. An enormous amount of work of this kind has been done, and in particular the sacred books of the E. have been ed. and trans. Upon this basis arose the study of comparative R.: the different elements of each R. were compared, and attempts made to reach the common thought that had dictated them. The meanings of primitive rites were made clear by comparison, and such ideas as sacrifice were traced through various Rts. The question of dependence of one R. upon another was also illustrated by this method.

In itself the study of comparative R. neither proves nor disproves the truth of any one of them, nor does it seek to do so; it does, however, show that while some are higher or more intelligent than others, yet there is a certain universality of idea. There has been a considerable danger of assuming that every likeness proceeded from essentially the same idea, whereas such analogies may be superficial.

Another study, the psychology of R., proceeding also on a factual basis, examines the various states of man under religious influence. Without entering into the question of what influence the Divine may exercise, it examines the state as it is from a human point of view, and so studies such phenomena as ecstasy, frenzy, diabolic possession, sudden conversion, faith healing. Thus it will distinguish how far these things are explained by purely natural causes, and how far these causes do not explain what may be found. Many books have been written also on what is called the philosophy of R. This is a reasoned attempt to demonstrate the value of R. to man's moral nature; to a large extent this branch of study coincides with natural theology (*q.v.*).

It is not possible either to summarise the numerous forms of R., or even to classify them adequately, since the lower ones often contain elements preserved in the higher. Indeed, it is only by these elements that they may be distinguished from superstition. It may be pointed out, however, that there are three strata, *viz.* (1) the animist type, in which the forces of nature are identified with the higher powers; (2) polytheism, in which the gods exist separately and in their own right as persons above this universe, and this may be subdivided by the fact that higher Rts. here show a positive moral code, where lower ones are confused and meaningless; and (3) monotheism.

The state of R. in the world to-day may be summarised in broad outline as follows: (1) Heathen, taking this term to include animist forms of R., and generally the lowest forms: central regions of S. America; the native tribes of Canada, Siberia, and Australia; central Africa. Animism prevails among Negroes, Red Indians, Maoris, Javanese, Finns, and the

old Mexicans. (2) Judaism, the R. of the Jews (*q.v.*), is strictly monotheistic, and is the basis of Christianity (*q.v.*) and Mohammedanism (*q.v.*). The essential religious interpretation of Judaism is ethical monotheism, that is, the belief in a code of morals bound up inseparably with the belief in one spiritual force, called God. It is Israel's legacy to mankind to have been the first monotheistic people. By reason of the vicissitudes through which its adherents have passed, Judaism has assimilated much from different sources, but the doctrine of the unity of God has ever remained intact. Indeed Judaism insists on a unity without qualification and rejects entirely the Christian Trinity. The Heb. Bible (*q.v.*) is the most complete record of Judaism, and on its principles and laws is built the whole structure of this R. God's ethical qualities of righteousness, holiness, faithfulness, and grace come into particular prominence in the teaching of the prophets (see PROPHECY). The number of Jews is relatively small, *viz.*, about 12,000,000 (in 1939 there were about 17,000,000, but 6,000,000 were massacred by the Nazis), of whom 4,700,000 are in Europe, 5,250,000 in N. and S. America; 1,220,000 in Asia, including Israel; 625,000 in Africa; 38,000 in Australasia. These figures are approximate estimates. (3) Brahminism (*q.v.*), the anct. polytheistic R. of India, where it still holds the vast majority of the people. Hindus are computed at 230,000,000. (4) Buddhism (*q.v.*), in offshoot of Brahminism, founded at Benares about 500 B.C. by the monk-philosopher Buddha, who taught a system of ascetic philosophy aiming at self-annihilation and absorption into the impersonal god Brahma. It subsequently spread to the N., and is found in Tibet, China, Korea, and Japan, and to the S., where it is found in Ceylon, Burma, Java, and Siam. Both branches differ considerably from the original philosophy in their popular worship of a number of deities, including Buddha, but the S. branch is closer to it than the N. As practised by the masses Buddhism is a polytheistic R. Adherents are reckoned at 150,000,000, of whom 12,500,000 are in India. (5) Shintoism, the native R. of Japan. It is a mixture of nature worship and the veneration of ancestors. As a number of deities are worshipped it may be classed as polytheistic. Owing to the success of other Rts., *e.g.* Buddhism, etc., it claims only a minority of the people, *viz.* about 25,000,000. (6) Confucianism, dates from the philosopher Confucius (*q.v.*), who lived in the Shantung prov. of China 537-478 B.C. His teaching accepted the prevailing R. of his country, which it embodied, and reinforced with his own moral and social teaching. It is a mixture of monotheism with the worship of inferior nature-spirits. In popular Confucianism ancestor worship plays a large part. It became the State R. of China, and numbers 350,000,000, including in this number followers of Taoism (see LAO TZE), a gross form of idol worship. (7) Christianity, founded from Judaism at the

beginning of our era by Jesus Christ, is strictly monothelistic. It was originally mainly an E. R., but since the conquests of Mahommedanism its predominance has been mainly in the W. To-day the bodies professing the Christian name may be classified as the Rom. Church, the Protestant churches, and the Orthodox churches. In Europe Rom. Catholicism is the predominant R. of the Lat. countries, S. Germany, Ireland, Poland, and Belgium. Protestantism is the dominant R. of the other N. countries. Orthodoxy prevails in the countries of E. Europe, viz. Greece, Yugoslavia, Bulgaria, Rumania, and was the profession of Russia until the Soviet revolution. All three branches have missions in the three continents of the new world. Central and S. America is Rom. Catholic, as far as it is Christian; N. America has 26,000,000 Protestants and 24,000,000 Rom. Catholics. There is a fourth smaller body known as Coptic Christians in Abyssinia and Egypt. General figures for these bodies are as follows: Rom. Catholics, 330,000,000; Protestants, 137,000,000; Orthodox, 30,000,000, outside the U.S.S.R., of which there are no figures available (though there is to-day a body called the Soviet Christian Church); other minor bodies, especially Copts, 7,750,000. In England and Wales the main figures are: Anglican (the 'estab. R.'), 2,134,897 communicants; Rom. Catholics, 2,700,000 (approximate official figure); other major Protestant denominations, approximately 2,328,000. In the U.S.A. 49 per cent of the pop. belong to a religious denomination, mostly Christian, 51 per cent have no ascription. (8) Mohammedanism or Islam is a strictly monothelistic R., founded by Mohammed, inspired by Judaism (*q.v.*) and Christianity (*q.v.*). The *hejira* or 'flight' (of Mohammed from Mecca to Medina) took place in 622, the official starting-point of the Moslem era. Mohammed's early message, based on the Heb. Bible, was: God is one; He is all powerful; He is the creator of the universe; there is a judgment day; splendid rewards in paradise await those who carry out God's commands, and terrible punishment in hell those who disregard them. The Koran, the sacred book of Mohammedanism, is divided into 114 chapters, containing 6239 verses, 77,934 words, and 323,621 letters. Conquests of the seventh and eighth centuries made Mohammedanism the dominant R. in the lands between India and the Atlantic Ocean. It spread later to W., central, and S.E. Asia, a great part of Africa, the Balkans, and to what is now S. or S.E. Russia. There are 221,825,600 Moslems, including 7,500,000 in China, and about 80,000,000 in Pakistan and India. There are about 100 sects, including the Shi'ites (mainly in Persia), Kharijites, Qarmatians, Ismaelites, Assassins, and the Sunnites, who form the great majority of Moslems.

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Religious Tract Society, see UNITED SOCIETY FOR CHRISTIAN LITERATURE.

Remagen, tn. in Germany, on the l. b. of the Rhine, 25 m. N.W. of Coblenz. It is built on the site of Rom. and Frankish tns. In March 1945 the Allies first crossed the Rhine at R. Pop. 5500.

Remainder, see CONTINGENT REMAINDER.

Remand, Remand Homes, and Remand Centres. A court of summary jurisdiction is empowered to remand an accused person either in custody or on bail, with or without sureties. The remand may be for the purpose of obtaining further evidence necessary for the trial, or it may be ordered after conviction but before sentence to procure information that would shed light on the most suitable method of dealing with the offender. No single period of remand may exceed three weeks. Under the Criminal Justice Act, 1948, it can be made a condition of remand on bail that the accused should undergo a medical examination at a specified institution, or by a specified medical practitioner. Unless there are valid reasons to the contrary a court is expected to remand an accused person on bail. An adult person remanded in custody is sent to a prison. Prisoners on remand and those awaiting trial by the higher courts are kept separately from other prisoners. Though they have certain privileges as to food, etc., they are subject to the general discipline of the prison, but are not required to work unless they wish to.

Since juvenile offenders cannot nor-

mally be sent to a prison special remand homes have been set up for them. These homes also provide accommodation for those who are awaiting vacancies in approved schools, whether they are delinquents or care and protection cases. Moreover, a child or young person found guilty of an offence punishable in an adult with imprisonment may be sent to a remand home as a penalty for a period not exceeding one month. The remand homes are controlled by the local education authorities, but under the Criminal Justice Act, 1918, no premises may be used for this purpose unless previously approved by the secretary of state, who must also approve the appointment of the persons in charge.

Since one of the aims of the Criminal Justice Act was to keep young adults out of prison, state remand centres are to be set up for offenders aged seventeen to twenty-one. These must have facilities for the observation of offenders on whose physical or mental condition a medical report is required by the courts. They will also be empowered to take young persons, aged fourteen to seventeen, on whom such reports are required if no other facilities are available, and those of this age who are 'too depraved or unruly' for a remand home. Until the remand centres come into being this latter group can still be sent to prison.

There is still no state provision for the observation of children under fourteen. Under the Criminal Justice Bill, 1938 (dropped on the outbreak of war), it was proposed to set up state remand homes for this purpose. There was no corresponding clause in the 1949 Act, though local remand homes are not usually large enough to provide the technical facilities needed.

Remarque, Erich Maria (b. 1898), Ger. novelist, b. at Osnabrück, his real name being Krause. He fought in the army in the First World War. He made his name with the war novel *In Western Nights*, trans. into Eng. by A. W. Wheen, under the title *All Quiet on the Western Front*, and pub. in 1929. In Germany, over which country it swept like a gospel, 500,000 copies were sold in less than three months from pub. It went further than the frankness of Zola, being brutal and devoid of romanticism, but alive with a terrible realism and pathos. It followed a spate of books on the First World War, mostly of indifferent merit, but outvalued its predecessors in its universality and detachment and in its avoidance of both rhetoric and any attempt to propagate pacific socialism. His later novels, though not so outstanding, continued the theme of a world in which the individual was crushed by the irrationalism and blind cruelty of the world. These are *The Road Back* (1931); *Three Comrades* (1937); *Flores* (1941); *The Arch of Triumph* (1946). After living in Switzerland for eleven years he went to the U.S.A. and became an Amer. citizen. In 1938 the National Socialists had deprived him of Ger. nationality.

Rembrandt, Harmens van Rijn (1606-1669), Dutch painter, b. in Leyden. His family recognised his artistic talent, and he was sent to study painting under Jan van Swanenburch. He then went to Lastman's studio in Amsterdam, and returned to Leyden to begin his career as a painter. His brilliant drawing and skilful use of oils estab. his reputation, and in 1631 he settled in Amsterdam. He married Saskia van Uylenborch in 1634, painting her many times. To this period belong his most light-hearted and gay pictures. He was extremely successful, but the fortune he amassed was soon dissipated by his extravagances. Saskia died in 1612, and R. married his housekeeper, Hendrickje Stoffels, a peasant. His last years were marred by financial



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troubles; his prestige as an artist fell, and his eyesight began to fail. He died neglected, in poverty.

R. stands pre-eminent among the Dutch masters, and his work equals the skill and beauty of Velazquez or Titian, while in his expression of spirituality he has no rivals. He was a most prolific painter, and some 600 of his paintings, 2000 drawings, and 300 etchings are extant. He led the reaction against It. influence in the Dutch school, and substituted naturalism in place of artificial classicism. In oils he painted portraits, landscapes, and religious subjects. His work can be grouped into three periods. At the time of his first marriage it already shows signs of his preoccupation with the effects given by using a full light upon the central point of interest, but he exercises the care in detail of a beginner, and frequently shows himself indebted to the teaching of his masters. In the second period R.'s entire treatment of a painting is bolder and more individual. The soft gold and brown shades, so characteristic of his greatest work, appear increasingly often, and his contrasts of light have become more forceful and dramatic. The final

period represents his work at its most mature, and, to this time, belong the majority of his masterpieces. He had learned to employ with great effect the power of chiaroscuro which he had discovered. A rich, deep red frequently appears among the browns and golds. The same three stages of development can be traced in R.'s etchings. In his earliest work of this kind, his paramount concern was accuracy of detail. Later he freed himself from this preoccupation, and, in his hands, the etching ceased to be predominantly a design, and became, like his portraits, a medium through which R. could express depths of spiritual feeling which even Durer, the other master of the art of etching, never attained. In his masterpiece, 'Christ healing the Sick,' as in other etchings of his most mature period, R. used the dry point to emphasise light and shadow effects; and he attained a broad majesty of conception, while not neglecting detail essential to his design and theme. His portraits are intensely lovely because of the depth and beauty of their characterisation. The character of R.'s painting is so unusual and so strong that his name has come to stand for certain marked features in art. He delighted in using strong contrasts in dark and light, and was an unsurpassed master in the use of shadows and half-tones. The strongest point of light in a picture expressed the crux of the subject. His portraits express intense humanity, and his studies of old people, peasants, and beggars are remarkably fine. R. excelled in minute detail, yet his works which contain large groups of people are wonderfully well composed. This skill of composition is admirably shown in 'The Syndics,' where, in spite of each study being strong as an individual portrait and apparently of equal importance, R. has made the picture a united whole, rendering as a complete study portraits of six distinguished gentlemen. His other works include 'Wedding Breakfast,' 'Portrait of Saskia,' 'Elizabeth Bath,' 'The Lesson in Anatomy,' 'The Night Watch,' 'Old Woman cutting her Nails,' 'Pilgrims at Emmaus,' 'Descent from the Cross,' 'Christ Healing the Sick.' The Brit. Museum contains a fine collection of his etchings and sev. of his pictures are in the National Gallery. See lives by G. B. Brown, 1907; J. Laran, 1925; O. Benesch, 1935; A. M. Hind, 1938; H. Dumont, 1948; and J. Rosenberg, 1949.

Remembrancer, King's, officer of the Exchequer dept. whose duties were to record certain documents and proceedings and issue processes. The officials so styled were formerly called clerks of the remembrance, and they were three in number, the K. R., the lord treasurer's R., and the R. of first fruits. The duties of the first and second of these offices were united by an Act of 1833. The style of R. is also applied to certain corporation officers, as, for example, the R. of the city of London.

Remigius, Saint (c. 440-533), apostle of the Franks, b. at Cerny or Laon; son of Emile, count of Laon. He probably

studied at Rheims, where, although a young man, on account of his learning and sanctity, he was elected archbishop in 459. He converted Clovis, king of the Franks, with the assistance of St. Vedast and Clovis's wife St. Clotilda. He erected bishoprics at Tournai, Cambrai, Terouanne, Arras, and Laon. He died at Rheims. His feast-day is Oct. 1.

Remington, Philo (1816-89), Amer. inventor, b. in Lithfield, New York. He superintended the mechanical dept. of his father's small-arms factory, and invented the breech-loading rifles and typewriter which bear his name.

Rémiremont, tn. in the dept. of Vosges, France, 16 m. S.E. of Epinal, on the Moselle. Its chief buildings of interest are the palace of the nuns and an old church originally belonging to them. The tn. manufs. cotton and leather goods. There was severe fighting near it in the Second World War, from Sept. to Nov. 1944. Pop. 10,300.

Remittent Fever, form of malaria in which the paroxysms are not separated by an apyretic interval, but proceed from a degree of great intensity to one of less intensity, and again to one of great intensity. The disease is caused by the malaria parasite carried by the *Anopheles* mosquito, and is characterised by the same general symptoms as other forms of malaria. The periodicity may take the form of quotidian or of double quotidian fever, except that the hot stage is prolonged and the cold stage shortened. When the patient nears recovery, and the paroxysms are diminished in intensity, the disease may take on the true intermittent form. The attack commences with chills and a feeling of weakness; but there is no shivering as in the cold fit of the intermittent, or, if there is, it is of very short duration. The hot stage sets in, the symptoms of thirst, delirium, quick pulse, enlarged spleen, and scanty urine common to malarial affections are intensified, with the addition of vomiting. The paroxysm may last six, twelve, or twenty-four hours, then a remission takes place; the pulse becomes slower, and the temp. falls, though it does not become normal. The remission continues for some hours, and then the symptoms begin to intensify. The treatment consists of systematic administration of quinine. See MALARIA.

Remizja (Remijia), genus of tropical trees of the order Rubiaceae, from which comes the caprea bark used in manufacturing quinine, especially from the species *R. villosa*. The bitter principle of the bark is 'vicine', or vicic acid.

Remonstrance, Grand, statement introduced into Parliament by Pym (q.v.) in 1611, which narrated in a series of clauses the alleged various unconstitutional acts and illegalities of Charles I., both in church and state matters, since the beginning of his reign. The debate on the G. R. was followed by a div. in which it was carried by eleven votes, and ordered to be printed as an appeal to the nation. The debate marked the emergence of a strong Royalist party in the Commons.

Remonstrants, Dutch Calvinist sect, founded by Arminius (*q.v.*). The name became attached to the group in 1610, after its members had sent a remonstrance to the states, denying that they wished to cause a conflict in the church. Prince Maurice secured their proscription in 1625, and they suffered bitter persecution until his death (1652). For doctrine *see* under **ARMINIUS**, **JACOBUS**.

Remora, *see* **SUCKING FISH**.

Remote Control, controlling of apparatus by electrical or mechanical means, usually by levers or switches, situated at a distance from the object being controlled. An example of R. C. is the pilotless aircraft known as the 'Queen Bee,' used by the artillery for target practice. This type of aircraft is controlled by radio, as also are pilotless boats. A further example of R. C. is the electrical equipment of large machines. By means of push buttons situated around the machine the electrical drive can be controlled by the operator even though the main control apparatus is some distance away. The photo-electric cell (*see* **PHOTO-ELECTRICITY**) has sev. applications, for controlling street lamps, opening doors, etc. Automatic telephone exchanges and other systems utilize the relay (*q.v.*). There are also methods of R. C. for the guidance of aircraft (*see* **RADIO DIRECTION FINDING**).

Remscheid, city of Germany, 18 m. E.S.E. of Düsseldorf. It is an important centre for the manu. of small steel and iron goods. It is noted for some fine baroque buildings. Pop. 101,200.

Remsen, Ira (1816-1927), Amer. chemist, b. in New York city, and educated in New York and Tübingen, Germany. He did research in pure chem. and became prof. of chem. at John Hopkins Univ. in 1876, and president from 1901 to 1913. In 1879 he founded the *American Chemical Journal*. In the same year he described in this jour. a new compound which he had discovered (with Fahlberg). This became known as saccharin.

Remus, twin brother of Romulus (*q.v.*).

Rémusat, Charles François Marie (1797-1875), Fr. statesman and man of letters, b. in Paris. He took to journalism at an early age, and also studied law. From 1830 to 1848 he was a member of the Chamber of Deputies, and in 1840 minister of the interior. After the *coup d'état* he was exiled, but returned to Paris in 1871, and became minister of foreign affairs under Thiers. During his absence from public life he devoted himself to literary and philosophical studies. Amongst his works are *Essais de philosophie* (1842); *L'Angleterre au XVIII^{ème} siècle* (1856); *Histoire de la philosophie en Angleterre depuis Bacon jusqu'à Locke* (1875); two philosophical dramas, *Abelard* (1815) and *La Saint-Barthélemy* (1878); and studies on various noted men, including Bacon, Channing, Herbert, Wesley, etc. His letters were pub. 1883-86.

Remy de Gourmont, *see* **GOURMONT**.

Remy, St., *see* under **RHEIMS**.

Renaissance, or **Revival of Learning** (Fr. *renaître*; Lat. *renascari*, to be born

again), name given to the important movement which marks the birth of modern Europe. The word was first applied to the revival of Gk. and Lat. forms in architecture and literature in Italy. But the R. was more than a pure return to ant. forms. Although it professed in some ways to despise the Middle Ages, it nevertheless emerged from the preceding centuries and owed much to them. Indeed, no definite line can be drawn between the R. and the period called medieval: R. tendencies existed alongside the medieval for centuries, and only gradually did society become wholly coloured and transformed by them; Dante was writing when the medieval world was apparently at its zenith. But the R. had qualities peculiarly its own. It represented an outburst of individualism, a new freedom of thought and action, a quickening of personality on every side of human life, from fashion in dress to speculation on this world and the next. It was intensely curious and intensely interested in humanity. With this interest in man came a new interest in the workings of nature and in science. There was a broadening and sharpening of a critical faculty which, though kept alive by the schoolmen, had not developed far in the atmosphere of ultimate reverence for authority which marked the Middle Ages. The R. began in Italy, which, though politically disunited and vulnerable to foreign invasion, possessed the standard of material well-being necessary for cultural development. Milan, Florence, and Venice especially had accumulated wealth by trade over a long period, and the growth of this middle-class urb. interest had broken the back of feudalism in N. and central Italy much earlier than elsewhere in Europe, except for similar areas of mercantile prosperity in Flanders and in some Ger. free cities. Italy, however, possessed other advantages which these areas lacked. She had a direct connection with the Rom. world; her geographical position and trade had kept her in constant and close touch with Greece and the E.; she had early developed a national language and literature, and was the home of a rich and intellectually enlightened papacy. Historical opinion is now generally inclined to the view that Europe was on the verge of discovering the impulses of the R. at the time when the R. percolating Italy from Byzantium, discovered Europe; Italy's geographical position was decisive in making her the centre of the new ideas. A new energy seemed to vitalise society. The R. ideal, unlike that of the medieval schools, was not of the specialist but of the all-round man, illustrated by the career of Leonardo da Vinci (*q.v.*), who was not only a painter, but a philosopher, metaphysician, athlete, inventor, and naturalist.

The medieval world had never entirely lost touch with the literature of classical times, but its knowledge was confined to a few writers, and was very fragmentary. In the days of Petrarch (1304-1374) its began to search more diligently for the lost treasures of Gk. and Rom. writers, to copy the style of the Romans,

and to learn Gk. Petrarch both sought classical learning himself and inspired others like Boccaccio to follow the same path. This movement grew in volume and vigour strengthened by successive discoveries of the writings of Gk and Lat authors. Long before the capture of Constantinople by the Turks (1453) teachers of Gk like Chrysoloras (c. 1400) found their way to Italy though the fall of Byzantium naturally accelerated the trend. The collection and copying of MSS became a considerable industry and libraries were established to house the precious texts, such as the Laurentian Library at Florence. Critical scholarship increased with the coming of printing.

Humanism was not confined to Italy. Reuchlin (1455-1522) (q.v.) furthered the knowledge of Gk in Germany though he

of Chaucer. In the early sixteenth century its beginnings appear in the centres of learning at Oxford and Cambridge and its earlier exponents include earnest and strenuous scholars like Roger Ascham, Nicholas Udall, and Sir John Cheke. The full flowering of R literary ideals is reached in the Elizabethan epoch. Sidney and Spenser have their continental counterparts but in the plays of Shakespeare literary skill is combined with a deep interest and understanding of human nature making Shakespearian drama among the highest expressions of the finest things for which the R stood.

But the revival was not merely literary. From the first the spirit as well as the letter of classical times appealed to the men of the new age. So to the humanists of the R neither the manner nor the matter of the scholastic education sufficed any longer. In this more secular age the classical writers were to be read and interpreted by and for themselves. That these writers were pagan did not prevent popes like Pius II or Leo X from fostering their study. In this art and literature the humanists found a new ideal of beauty and freedom. This led sometimes to corruption and licence though it would be inaccurate to attribute the moral decadence of the period in Italy to the classical revival. Guicciardini and Machiavelli the two greatest historians of the It R found their inspiration and model in the ancient political and historical writers notably Livy. It was not however the arts, letters or philosophy of the Gks that attracted Machiavelli but the histories describing the statecraft and organisation of the Romans. Guicciardini's *Discorsi e Ordini* equally with Machiavelli's *Principe* represents the spirit of the It people in the last phase of the R. The great exponent of the spirit of classical literature in Italy in the same period was Ariosto. The new interest in the individual led to the development of biographical and autobiographical writing. The educationists of whom da Vinci's outstanding hand their theories of education largely on classical models and on the study of Lat and Gk.

Modern architecture is directly descended from that of the It R. Men had not lost touch with the ideas of Rome and Byzantium but new interest became more specialised. The definition of the various classical orders of architecture by Vitruvius the Roman architect and engineer of the Augustan age was revived and applied especially by Palladio (1518-80). But R builders did not copy slavishly. They adapted and combined classical and above all Roman forms with existing styles so that an altogether new type of architecture finally evolved. In Italy Florence led the way. Brunelleschi's dome for the cathedral (1436) serves as an outstanding example of the new trend. St Peter's Rome, which contains examples of the various stages of R architecture, is another. The It styles spread to France, partly through the It invaders of the country and there found its best expression in secular royal buildings, like Lou-



John H. Stone

RENAISSANCE ARCHITECTURE IN ENGLAND
Fan vaulting in the roof of the Henry VII
Chapel, Westminster Abbey

was more interested in Hell and the Bible than in pagan learning. This preoccupation with the spiritual characterises the N R. Through Reuchlin and von Hutten in Germany, Lefèvre d'Étaples in France, Linacre, Grocyn, Colet and More in England and above all through Erasmus of Rotterdam the humanism of the R in Italy was connected indirectly with the Reformation in religion. Many of these N humanists never swerved from their adherence to the Catholic Church. More died rather than deny its supremacy and it is now generally acknowledged that but for other existing conditions the R might have encouraged merely religious reform and not the break up of religious unity. As it was however the New Learning helped to dispose men's minds for the Reformation. In France the It gave a new stimulus to literature as may be seen in the lyric poetry of Ronsard and the Pléiade. In prose Rabelais's vast novels exhibit the freedom licence and immense vitality of the new humanism. In Montaigne can be found the intense interest in the individual and the clarity of expression to be typical of the greatest age of It prose. In England the beginnings of the R can be seen in the works

tainbleau and the early Louvre. In Germany, Heidelberg Castle and many tn. halls (*Rathäuser*) of the free cities show the transition from Gothic to the new ideas. Antwerp tn. hall (1565) illustrates their penetration to the Low Countries. In England the transition to classicism was slower, and unique in character. The last glories of Eng. Perpendicular owe part of their charm to R. touches of decoration: a fine example of the combination of Perpendicular and baroque can be found in the ceiling treatment in one of the smaller chapels of Ely Cathedral. The gracefulness of the Eng. architectural R. owes much to the interest of Henry VI. and Edward IV. in the arts, while the disturbed state of the country during the wars of the Roses, by making building operations more protracted, ensured that the transition should be slow, an adaptation rather than, as in Italy, complete rebuilding (except in necessary cases, like St. Paul's). Not till Inigo Jones returned from Italy in the seventeenth century did the change become rapid, to reach its zenith with Wren.

The genius of the R., its freedom, love of beauty, joy in nature and humanity, found its most complete expression in painting. The development was partly one of technique, marked by the increased knowledge of perspective, of light and shade, of the anatomy of the human body, the discovery and growing use of oil for painting. The growth of variety and luxury in dress at this period affected painting, as did the increased interest in secular life. Religious scenes were still painted, but artists dealt increasingly with the life around them. They concentrated more on portraits and painted scenes from pagan mythology. Da Vinci and Raphael achieved perfection of draughtsmanship and colour-work, but after them lt. painting declined, though its technical skill was retained. Outside Italy the rise of a new spirit in art is best seen in Germany and Flanders. Dürer and Holbein are the two outstanding Ger. artists. In Flanders, where there was an accumulation of wealth comparable to that of the N. It. tns. there was a native growth of painting independent of Italy, and of great importance. In the early fifteenth century the Van Eycks brought a new science of colour into painting. Bouts and Memling contributed an accuracy of perspective and a better knowledge of humanity. The Brueghels based their interpretation of Flem. secular life on these foundations.

The R. opened up new fields in every branch of science. Ptolemy's theory that the earth was the stationary centre of the universe was destroyed. Copernicus, Brahe, Kepler, and Galileo were the founders of the new school of inquiring astronomers whose ideas were too strong to be quelled by any opposition. Other sciences also developed. Astronomy depended on the parallel developments in mathematics and physics. Modern chem. was slower, but already the Swiss, von Hohenheim (1493-1541), had declared that the true work of chem. was not to make

gold but to prepare medicines. Medical knowledge was progressing. The new interest in man led to the closer study of anatomy. It has been seen how this influenced painting. It also led to further developments in the field of medicine itself, such as the discovery of the circulation of the blood by Wm. Harvey in the early seventeenth century. Printing, which was to make knowledge so much cheaper and widely accessible, has already



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RENAISSANCE PAINTING: ITALY
'Beatrice D'Este' by Leonardo da Vinci.

been mentioned: the telescope, microscope, and the spiral spring, which provided the first watches, were among other inventions.

The development of navigation, with the use of the astrolabe, quadrant, and sextant, their use bound up with the growth of astronomy, and the revival of the classical interest in cartography both affected and were affected by the explorations which marked another side of the R. In Spain and Portugal the main energies of the new age were directed to this channel; and in England and France exploration and colonisation, though they came later, were also important. The significance of the discoveries can hardly be exaggerated. The widening of the physical horizon brought a corresponding extension of the intellectual horizon, which profoundly affected the political, philosophical, and religious ideas of the

next centuries. See also ARCHITECTURE; PAINTING; FRANOR, *Literature and Art*; ITALIAN ART; ITALY, *Literature*; ERASMUS; LEONARDO DA VINCI; RAPHAEL, etc.

See J. Burckhardt, *The Renaissance in Italy*, 1875; J. A. Symonds, *The Renaissance in Italy*, 1875-88; J. A. Gotch, *Early Renaissance Architecture*, 1891; R. Bloomfield, *Renaissance Architecture*, 1897; L. F. Field, *Introduction to the Study of the Renaissance*, 1898, and *The Medici and the Italian Renaissance*, 1901; C. H. Hoskins, *The Greek Element in the Renaissance of the Twelfth Century*, 1920; L. Batiffol, *The Century of the Renaissance*, 1921; S. Dark, *The Story of the Renaissance*, 1923; H. Häffding, *History of Modern Philosophy*, 1924; C. Davenport, *Architecture in England*, 1924; E. Sichel, *The Renaissance*, 1928; W. H. Hudson, *The Story of the Renaissance*, 1930; A. von Martin, *Sociology of the Renaissance*, 1945; J. Atkins, *The Renaissance*, 1947; and F. J. Mather, *Western European Painting of the Renaissance*, 1948.

Renaix, see RONSE.

Renal Calculus, see under CALCULUS.

Renan, Joseph Ernest (1823-92), Fr. philosopher, philologist, and historian, b. at Tréguier, Brittany; he studied originally for Rom. Catholic priesthood, but quickly abandoned this vocation. In 1840 he studied philosophy at Issy, and later at St. Sulpice, and in 1845 proceeded to the Oratorian lay college of Stavistas. He became deeply interested in the study of oriental languages, and in 1847 he won the Volney prize (Institut de France) by an essay on Semitic languages, and wrote also the *Future of Science*, pub. 1890. This is noteworthy as foreshadowing later developments; in it he anticipated a state in which philosophy and culture should supersede politics and religion. During 1849 he travelled in Italy, gathering material for his thesis on *Averroës* (pub. 1852). He became a member of the Académie des Inscriptions in 1856. His *Études d'histoire religieuse* (1857) and *Essais de morale et de critique* (1859), including the celebrated essays on *Celtic Poetry*, on *Critical Historians of Jesus*, and on *Feuerbach*, and his new trans. of the Book of Job and the Song of Songs (1859), appeared prior to his Syrian tour (1860). On his return from Syria, he succeeded Quatremère as prof. of Heb. at the Collège de France; but his rationalistic attitude caused his suspension until 1870, after the siege. Meanwhile he began his great 'History of the Origins of Christianity': *Vie de Jésus* (1863); *Les Apôtres* (1866); *St. Paul* (1867); *Antichrist* (1873); *Les Évangiles* (1877); *L'Eglise chrétienne* (1878); and *Marc Aurèle* (1880). *The Life of Jesus*, in which R., writing purely as critic, philologist, and historian, accepted Jesus simply as an inspired but human philosophic teacher, caused an immense uproar in orthodox circles; and no fewer than 1500 books and pamphlets appeared in controversy during the ensuing twelve months. The remaining years of his life were occupied chiefly with his philosophic dialogues and dramas (1878-88), his *Souvenirs* (1883), and the 5-vol. *Histoire du*

peuple d'Israël (1887, et seq.). In 1878 he became a member of the Fr. Academy, and two years later gave a course of Hibbert lectures in England on *The Influence of Rome on Christianity*. R. was a master of language; his prose is the finest produced in France during that epoch. His philosophy contains half-truths and superficialities caused by his habit of sliding over, rather than facing, difficulties. Yet his research caused a controversy which survived his death and affected the position of institutional Christianity to an extent hard to estimate. R. always denied that he was an atheist. See lives by H. Taine, 1894; G. Sorcel, 1906; and M. Weller, 1945.

Rendsburg, tn. of Schleswig-Holstein, Germany, on the Kiel Canal, 16 m. S. of the port of Schleswig; it has manufs. of textiles, pianos, fertilisers, leather, and beer. During 1841-51 it was the seat of the provisional government of the insurgent Holsteiners. Pop. 19,500.

Renegade (Sp. *renegado*, a turn-coat), term used of Christians who became Muslims to escape persecution. It now denotes one deserting a faith, cause, or country for an opposing one, for reasons other than conscience.

René the Good (1409-80), duke of Anjou and Lorraine and count of Provence and Piedmont, second son of Louis II., king of Sicily and Naples, b. at Angers. He succeeded to the dukedom of Anjou on the death of his brother, Louis III., and to the kingdom of Naples through the death of his brother, and of Joanna, queen of Naples, the last heir of the earlier dynasty. Although he retained the title, he failed to establish an effective claim. In 1411 he negotiated with the Eng. at Tours, and he married his daughter Margaret to Henry VI. the following year. R. encouraged art and literature, and founded numerous charities, which earned for him his title. He himself wrote some verses and poems, his works being pub. at Paris and Angers in 1843-46. See J. Staley, *King René d'Anjou and his Seven Queens*, 1913, and E. Trenkler, *Das 'Livre du cuer d'amours esprits' des Herzogs Rene von Anjou*, 1946.

Renfrew: 1. Royal and municipal burgh, and co. tn. of Renfrewshire, Scotland, on the Clyde, 6 m. W.N.W. of Glasgow; it has shipbuilding and various engineering industries, and manufs. of iron goods and chemicals. In 1786 it was connected with the Clyde by a canal, and new docks and basins to accommodate the largest vessels have since been completed. There is an airport. It claims to be one of the oldest burghs in Scotland. It has lost some of its former importance; it was once a great Clyde port. Pop. 17,500. 2. Tn. of Renfrew co., Ontario, Canada, on the R. Bonnechere, 58 m. W. of Ottawa; it has manufs. of textiles and machinery. Pop. 5700.

Renfrewshire, S.W. co. of Scotland, bounded N. and W. by the frith of Clyde, E. by Lanarkshire, and S. by Ayrshire. It is 30 m. long and between 10 m. and 14 m. wide, with an area of 240 sq. m. The surface is diversified, but rises towards

its S. border, the highest peak being the Hill of Stake (1710 ft.). The co. is watered by the Clyde, the Gryfe, and the White and Black Cart. The grassy uplands afford pasture for large numbers of sheep and cattle, and dairy farming is extensively carried on. Agriculture is an important industry, and the minerals include coal, copper, ironstone, and barytes. Greenock, Port Glasgow, and Paisley are the prin. tns., the first two being important seaports; smaller tns. are Johnstone and Barrhead. The co. tn. is Renfrew, and Gourock is a popular holiday resort. There are manufs. of thread and cotton (chiefly at Paisley), bleaching works, pottery, chemical works, and sugar refineries. Engineering and shipbuilding are also engaged in. The co., which once formed part of the anct. prov. of Strathclyde, returns two members to the House of Commons. Pop. (1939) 321,200. R. was the heritage of the Stuarts, and it has given its name to one of the titles borne by the heir-apparent since the time when Robert III. made his son baron of Renfrew. William Wallace is said to have been born at Elderslie, near Paisley. The battle of Largs (1263) was fought within the co. Antiquities of interest include sculptural stones at Inchmurrain.

Reni, Guido (1575-1642), see GUIDO.

Reni, tn. in Bessarabia, on the Danube, near its confluence with the Pruth, 110 m. S.W. of Odessa. Pop. 8300.

Renmark, port of S. Australia, on the R. Murray, 75 m. W. of Morgan, with which it is connected by a steamer service. It was one of the earliest irrigation colonies, being estab. as such in 1887. Fruit-growing is estab. on a co-operative basis. Many of the settlers are ex-soldiers, settled on land specially developed for them after the two world wars. Pop. 4300.

Renn, Ludwig (b. 1859), Ger. author, b. in Dresden, his real name being Arnold Vietz von Golschmann. His first novel, *Krieg*, a harsh and realistic treatment of the First World War, caused a sensation on pub., and in Germany almost equalled the popularity of Remarque's *In the West Nothing New*. Later R. became a Communist. His later novels include *Nachkrieg* (1930); he pub. his autobiography, *Adel im Untergang*, in 1941.

Rennell, James (1742-1830), Eng. geographer, b. at Chudleigh, Devon. His studies of oceanography and topography greatly influenced the development of Eng. geographical research. His pubs. include *Memoir of a Map of Hindostan* (1783) and *An Investigation of the Currents of the Atlantic Ocean* (1832).

Rennell of Rodd, James Rennell Rodd, first Baron (1858-1911), Brit. diplomatist and classical scholar. Educated at Haileybury and at Balliol College, Oxford. After leaving Oxford, where he won the Newdigate prize, his first diplomatic post was in Berlin in the last days of Emperor Wilhelm I., of whom he was a personal friend. He was in charge of the Brit. agency at Zanzibar in 1893, and in Abyssinia in 1897 led a Brit. mission to

Menelik. In Egypt he served under Lord Cromer. He remained in Africa until 1901, returning to Rome as secretary of legation (1901), and from 1904 to 1908 was Brit. minister at Stockholm. In 1908 he was appointed ambas. to Italy, where with the Fr. ambas., Camille Barrère, he was largely instrumental in divorcing Italy from the Triple Alliance. After the First World War he went to Egypt with Milner's mission; served as Brit. delegate to the League of Nations, 1921-23; entered the Commons as Conservative member for Marylebone, 1928; and was raised to the peerage in 1933. His 3-vol. *Social and Diplomatic Memories* covers his career between 1884 and 1919. Other works: *Customs and Lore of Modern Greece* (1892); biography of Sir Walter Raleigh (1904); *The Princes of Achaia and the Chronicles of Morra* (1907); *Love, Worship, and Death* (1919, a Gk. anthology); *Homer's Ithaka* (1927); *Rome of the Renaissance and To-day* (1932); and sev. vols. of poems, including *Poems in many Lands* (1886).

Renner, Karl (b. 1870), Austrian lawyer, Socialist, and statesman, b. at Untertannowitz, Moravia, the son of a farmer, and educated at Vienna Univ. He entered the Austrian Parliament in 1907, and became leader of the Social-Democrats. On the dissolution of the empire he led the Austrian delegation to St. Germain-en-Laye, 1919, where the frontiers of the Austrian republic were settled. From 1919 to 1920 he was chancellor. After the coalition on which his gov. relied fell, he devoted his time to the study of social organisation, and to the foundation of a number of non-political workers' institutions. R. was imprisoned for a short time after Dollfuss's murder, and after his release lived in retirement at Gloggnitz. After the Second World War he headed the provisional gov. set up by the Allies, his appointment having special Russian approval. But R.'s policy soon emerged as independent and to-tally devoid of any leanings towards Communism, and at the end of 1945 he was elected president of the Austrian republic. R.'s consistent support of Socialist principles never prevented him from making every effort to co-operate with the Catholic political groups in Austria, and his example of combined idealism and conciliation undoubtedly played a large part in the estab. of a post-1945 Austrian republic on W. European lines.

Rennes, tn. of France, cap. of dept. Ille-et-Vilaine, 51 m. S.E. of St. Malo. It has a univ. (founded in 1735), and an agric. school, and is the seat of an arch-bishop. It is an important railway centre and essentially a modern tn.—in spite of having been the anct. cap. of Britanny—as the old tn. was destroyed by fire in 1720 and had to be practically rebuilt. The Palais de Justice, built in the early seventeenth century, was the seat of the parlement of Britanny. The cathedral was begun in 1787, on an anct. foundation. The chief manufs. are textiles, leather, agric. implements, and crockery, and there are foundries and printing works. In 1356

It was besieged by the Eng. and in 1899 Dreyfus was tried here for the second time. R. was occupied by the Gers. in June 1940, and liberated by Amer. forces in Aug. 1944. There was little war damage. Pop. 113,500.

Rennet, preparation obtained from the fourth or R. stomach of the calf, having the power of coagulating or clotting milk so that the fat is entangled in the curd. A standard of strength is that one part of R. should coagulate 10,000 parts of sweet milk in forty minutes at a temp. of 95° F. It is prepared and obtainable in solution and as tabloids and powder. See also KENNIN.

Rennie, John (1761-1821), Brit. civil engineer, b. at Phantassie, E. Lothian, Scotland, and educated at Edinburgh Univ. In 1784 he entered the service of Boulton & Watt, being commissioned by them to construct machinery for the Albion Flour Mills, Blackfriars Bridge, London. In 1790 he began constructing canals, and amongst his numerous works in England are the Avon and Kennet, Rochdale, and Lancaster canals; Waterloo (since demolished and replaced by a new bridge), Southwark, and London bridges; the London and East India Docks on the Thames; Sheerness and Chatham dockyards; and Holyhead and Kingstown harbours. In 1798 he was elected F.R.S., and was one of the leading civil engineers of his age.

Rennin, or **Chymosin**, digestive enzyme or ferment found in the gastric juice of man and other mammals. It is responsible for the clotting of milk in the stomach by the conversion of soluble caseinogen into insoluble casein. Whereas liquid milk would pass quickly into the intestine, the clot is retained in the stomach, where the casein, a protein, is digested by the ferment pepsin, also present in gastric juice. A commercial extract of R. known as rennet (*q.v.*) is used for preparing junket from milk by the same process as occurs naturally in the stomach.

Reno, city of Nevada, U.S.A., and co. seat of Washoe co. on the Truckee R. It has an airport, and is served by the S. Pacific and other railways. It is the financial and commercial centre of Nevada and of that portion of California near the Nevada line, and is the largest city in the state. The state univ. is in R. Machinery, plaster, etc., are manufactured, and it is the centre of an agric. and mining area. But it has achieved world-wide notoriety as the so-called cap. of divorce. Nevada laws require only six weeks' residence in order to qualify to sue for divorce in its courts, and the laws stipulate a very large number of grounds upon which divorce can be claimed.

Renoir, Pierre Auguste (1841-1919), Fr. artist, b. at Limoges. He was apprenticed to a Paris porcelain-maker, and later painted fans and blinds. In 1861 he studied painting under Gleyre; he met Cézanne, Sisley, Monet, and Bazille. He became an Impressionist, and first exhibited at the Salon in 1864. Ten years later he took part in an exhibition with

other Impressionists. His early work is remarkable for its colour and gaiety; later he specialised in rendering texture, and in achieving subtle half-tones of colour. 'Les Parapluies' is a study of greys, blues, and lavender, skillfully combined to give a vivid impression of movement and constant variety within the limited colour framework. His famous paintings of nudes include 'La Baigneuse.' R. was a prolific and spontaneous painter; he did over 150 lithographs and 6000 paintings. He is best remembered for his colourful studies of contemporary Paris life. See lives by G. Besson, 1930; M. Florissoon, 1938; and G. Bazin, 1940.

Rent, money or other payment made for the use of land, and also for the use of houses or other buildings; i.e. it may be for the right to cultivate a given area, to occupy buildings on it, or to work minerals under it. It is therefore only a form of interest on capital. The older economists, while accepting this popular meaning, endeavoured to give the term more precision. They regarded R. as the share of production which accrues to the owner of the land, as opposed to interest and wages that accrue to the capitalist and the worker respectively. Ricardo elaborated a doctrine of R. based on the definition that it was the price paid for the use of the 'original and indestructible powers of the soil.' This is often referred to as economic R. In theory R. is fixed by an economic law: it is the amount which one will pay for land that is of greater value than no-rent land, as it is called. The net value of the crop produced on such land over the value of that produced on no-rent land will be paid by a tenant for its use, because the land is worth that much and no more to him; and the same principle is true of site values. This theory, however, requires qualification: as regards agric. land capital has been put into it in the shape of clearing, drainage, reclamation, buildings, etc., so that the R. is for the greater part interest on capital. In practice it is impossible to differentiate between the original powers of the soil and those arising from capital investment in improvements; while proximity to a market and suitability for alternative uses may also enter into the question. It may therefore be said to be simply a periodical payment made by the tenant or *de facto* user of immovable property to the landlord or owner of it. The origin and development of such a relation is a matter of hist.; its regulation is a matter of law. In the early Middle Ages rents were paid by services (ploughing the lord's soil; knight service, etc.) and payments in kind. When the money economy was introduced, the services, etc., were commuted (e.g. by scutage (*q.v.*)). In this way originated the customary Rs., which became competitive Rs. when agriculture was pursued for gain. Competitive Rs. may become excessively high when agric. prospects seem especially good, as, for example, during the Napoleonic wars or when there is little or no alternative means of employment, as happened in Ireland,

when as a consequence Rs. had to be adjusted by Act of Parliament. Hence, under the Land Act, 1881, the Irish tenant was given fixity of tenure (subject to eviction for default), free sale, and 'fair' rent assessed by the land court, thereby instituting what was in effect a system of dual ownership. State control of free competition was introduced on a large scale during the First World War. Rents were restricted by special legislation and, after the war, increases in R. were regulated, and this system of rent restriction is still in operation. *See also* HOUSING; LAND LAWS; LANDLORD AND TENANT; RENT RESTRICTION.

Renton, vil. of Dumbartonshire, Scotland, on the R. Leven, 2 in. N. of Dumbarton. It was formerly engaged in bleaching and printing calico, but these industries have now been superceded by light engineering works. R. was the bp. of Smollett. Pop. 5000.

Rent Restriction. In 1915, to deal with the changed conditions due to the First World War, it became necessary to restrict by law the power of landlords to raise rents, as the serious shortage of houses would have enabled them to do this to an excessive extent. At first such legislation was only temporary, but the restriction has been continued ever since, with modifications, by a series of statutes (*see under* LANDLORD AND TENANT). Rent tribunals were estab. under the Furnished Houses (Rent Control) Act, 1946, and returns issued by the Ministry of Health in 1949 showed that 41,106 cases had been referred to the seventy-nine rent tribunals in England and Wales since the Act came into force (June 1946).

Rent Tribunal, *see under* RENT RESTRICTION.

Renunciation, *see* REPUDIATION.

Renwick, James (1662-88), Scottish preacher and Covenanter. He studied at the univ. of Edinburgh and Groningen (Holland), was ordained, and went to Dublin. In 1683 he crossed over to Scotland and preached at Darncead. The privy council of Edinburgh denounced him as a traitor, and so he wandered about preaching and publishing manifestoes for some five years, concealing himself in caves. Through not having acknowledged James II. (1685), R. again had to conceal himself, but at last he was caught in Edinburgh and executed.

Repairs, *see under* LANDLORD AND TENANT.

Reparations, payments, in money or kind, by a defeated country in accordance with the demands of the victors, such payments particularly used as 'reparation' of damages caused by the war. The expression was used particularly for the payments to be made by Germany after the First World War. The amount was left for later computation in the treaty of Versailles. Demands made in 1920 and 1921 (the London Conference of 1921 fixing a total of £6,600,000,000) proved unrealistic, and after a first payment in Sept. 1921 a moratorium was granted. In 1924 a new scheme, known as the Dawes Plan (*q.v.*), was agreed to. This failed, and in 1929 it was replaced by the Young

Plan (*q.v.*), which fixed a total of 37,000,000,000 marks, payable in fifty-nine ann. instalments, beginning with 600,000,000 marks, increasing to 1,200,000,000, and then decreasing again. This scheme also failed, and in 1932 an international conference at Lausanne decided to cancel R.

The question of R. for war damage is a great and intricate one. After the war of 1870-71 France had to pay to Germany the relatively small sum of 5,000,000,000 gold francs. This very soon threw the Ger. economy into a state of disequilibrium, the after-effects of which were long felt. If R. cannot be paid out of the gold reserves of the country concerned they must be paid in kind, *i.e.* through exports of goods and services. This means that the debtor country must be able to make these exports and the creditor countries must be willing to receive these exports, which, in fact, may compete with their own production. This is the 'transfer' problem, widely discussed in the nineteen-twenties. In fact the larger part of the R. then actually paid by Germany was met out of the Dawes and Young loans raised in allied countries, which later also helped Germany to rearm. One of the first who saw the mistakes of the R. policy was Mr. (later Lord) Keynes, who gave a warning voice as early as 1919. Although in fact R. were only a small burden on the Ger. economy they were a welcome pretext for nationalistic political agitation which preceded the advent of the National Socialist regime.

The allies were determined not to repeat these mistakes after the Second World War. R. on this occasion were to be paid not out of *current production*, but by the transfer of technical productive *capital* equipment (industrial plant, installations, ships, etc.) to the war-devastated countries in order to accelerate their recovery. The principles to be applied were decided at the Moscow and Potsdam conferences, viz. that (1) first and foremost Germany must be disarmed; (2) Germany should be treated as an economic unit; (3) no foreign credit was to be given to Germany for reparation purposes; (4) R. were not to be taken from current production; (5) with certain exceptions no payments were to be made in cash; (6) the standard of life in Germany should not be higher than the average standard in Europe; (7) R. must not prevent Germany from paying for essential imports. The Potsdam conference (*q.v.*) applied these principles in detail. Russia was to receive all R. from the Russian zone in Germany; also 10 per cent without compensation from the other zones and 15 per cent in exchange for various deliveries (and also Ger. assets in E. European countries). Russia to pay Poland her R. share. The other allies were to receive all R. coming from the W. zones (less 25 per cent for Russia) and Ger. foreign assets not allocated to Russia. Reparation questions between the allies (apart from Russia and Poland) were settled at Paris in Dec. 1945, where also the Inter-Allied Reparation Agency (for the distribution of Ger. R.) was estab.

Policy, however, on such a subject cannot be final, but must be adapted to changing conditions. As economic unification of Germany was frustrated by Russia, the permitted level of industry in W. Germany was raised in 1917, and an additional number of factories was exempted from dismantling for R. in Nov. 1949. The Russians did not keep the Potsdam agreement in that they took R. out of current production. Italy has to pay £100,000,000 R. to Russia, partly from current production; Britain renounced her claim to R. from Italy in 1945. Russia is also receiving R. from Finland, Bulgaria, Rumania, and Hungary.

See J. M. Keynes, *The Economic Consequences of the Peace*, 1919.

Repatriation, return to their countries of origin of persons displaced therefrom as refugees or prisoners-of-war.

Repeal, formal abrogation of an Act of Parliament. Acts, however anct., which remain unrepealed, are still law, and cannot, in strict theory, lapse by desuetude, however incongruous their provisions may be with modern conditions.

Repeating Rifle, see RIFLE.

Repertory Theatre, strictly a theatre with a permanent company and a repertoire of plays, such as the Comédie-Française; there is no such theatre in the United Kingdom. The term is used for a theatre maintaining a regular company, on a seasonal basis, performing a fresh play, weekly or fortnightly, though the Old Vic and the Stratford-on-Avon Shakespeare Festival Company make a repertoire of their plays for the season. The oldest surviving R. T. is the Playhouse, Liverpool, which was founded in 1911. The Birmingham R. T., under the direction of Sir Barry Jackson, the first specially built theatre for the purpose, was founded in 1913 after sev. years' experimentation with an amateur company.

The Cambridge Festival Theatre (1926-1934), estab. by Terence Gray, specialised in modernist productions. In 1923 the Oxford Playhouse was founded. It has been reconstituted and rebuilt since its foundation, and presents a range of plays varying from classic pieces to popular farce and comedy, and plays by new writers. James Bridie founded the Glasgow Citizen's Theatre in 1913, to present 'plays of artistic or didactic merit which would not otherwise be seen in Glasgow' in order to encourage a school of Scottish playwrights. There are other R. Ts. at Bristol, Northampton, Sheffield, Nottingham, Bradford, and elsewhere. Many theatres have repertory seasons from time to time. The Old Vic has a stock company for the performance of Shakespeare's and other plays. The Shakespeare Memorial Festival Theatre at Stratford-on-Avon is conducted on R. T. lines during the Shakespeare birthday festival (spring), and is followed by a summer season, when the permanent company gives a different play each night. The Arts Council conducts the Royal Theatre, Bristol, and the Arts Theatre, Salisbury, on a repertory basis, and is interested in repertory companies in Coventry and

Swansea. In 1946 *The Stage* listed 220 repertory companies, mostly on a commercial basis, as compared with seventy-five in 1939.

See D. MacCarthy, *The Court Theatre*, 1907; P. P. Howe, *The Repertory Theatre*, 1910; Bache Matthews, *A History of the Birmingham Repertory Theatre*, 1921; St. J. Ervine, *The Organised Theatre*, 1924; A. Nicoll, *The English Theatre*, 1938; and N. Marshall, *The Other Theatre*, 1946.

Repin, Ilya Yefimovich (1844-1918), Russian painter, b. at Tschuguev. He studied at the Academy of Fine Arts, St. Petersburg, for six years, and then travelled in France and Italy. In 1894 he was appointed prof. of historical painting at the St. Petersburg Academy. His paintings are characterised by dramatic force and brilliant colouring: his portraits of Tolstoy and Rubinstein being considered among his best achievements.

Repington, Charles à Court- (1858-1925), Eng. soldier and military critic, b. in London, and educated at Eton and Sandhurst. He served in Afghanistan, Burma, the Sudan, and S. Africa. R. was military correspondent of *The Times*, 1911-13, publishing the sensational message on the shell shortage which opened the way to a political crisis. In 1920 he pub. *The First World War*, which suggested that war policies had been worked out against a background of social manipulation and personal relationships, and caused a sensation upon pub.

Replevin (O.F. *re*, again; *plevine*, warrant), whereby a person distrained upon has the distress returned into his own possession, upon giving security to try the right of taking it in an action, on condition that if the action goes against him he will return the cattle or goods once more into the hands of the distrainer.

Reporters and Reporting, see JOURNALISM; NEWS-PAPERS.

Repoussé (Fr. 'boaten back'), term generally employed in connection with metal work, by which a pattern or design is hammered from the inner side of the object to be decorated, the design being perfected on the outside by means of chasing tools. The early Egyptians and Etruscans largely practised this work, and the finest specimens were made in the sixteenth century by Benvenuto Cellini. Good examples have also been produced in France.

Representation. The germ and development of the representative idea in England has been treated in the articles ELECTORATE, PARLIAMENT, and JURY. In theory government by R. gives to the representatives chosen a wider mandate than that granted to ordinary delegates or to the holders of proxies. Since the end of the nineteenth century the representative system, as it had evolved from medieval times, has been frequently criticised, and in many countries it has been modified by the adoption of proportional R. (q.v.) in parl. and other elections, and the introduction of the machinery of the referendum (q.v.).

Parliamentary Representation in the United Kingdom since 1935—1935: Conservative vote, 10,488,626, seats, 387; National Labour, 339,811, seats, 8; National Liberal, 866,624, seats, 3; National, 97,271, seats, 3; Labour, 8,325,260, seats, 154; Independent Labour Party, 139,517, seats, 4; Liberal (Samuel), 1,377,962, seats, 17; Independent Liberal (Lloyd George), 65,150, seats, 4; Communist, 27,117, seats, 1; Republican, 56,833, seats, 2; and Independent, 217,666, seats, 2. Thus the Labour party secured one seat for every 54,000 electors, the Liberal (Samuel) one seat for every 81,000 electors, and the Conservative party one seat for every 27,000 electors. 1945: Labour vote, 11,992,292, seats, 393; Conservative and supporters, 9,960,809, seats, 213; Liberal, 2,230,668, seats, 12; Communists, 102,780, seats, 2; i.e. the Labour party had one seat for every 30,515 (approx.) electors; the Conservative party one seat for every 46,764 electors; the Liberal party one seat for every 186,639 electors. The remaining 20 seats were divided among six other parties and Independents. Feb. 1950: Labour, 13,295,736, seats, 315; Conservative and supporters (Ulster Unionists, Liberal Conservatives, etc.), 12,501,983, seats, 298; Liberal, 2,621,489, seats, 9. The Labour party had one seat for every 42,208 electors; the Conservative party and supporters one seat for every 41,952 electors; and Liberal, one seat for every 291,276 electors. The remaining 3 seats belonged to the Irish Nationalists (2) and the Speaker.

Representatives, House of, lower house of the congress of the U.S.A. and, later, applied to the lower house of other bicameral legislatures. The membership of the Amer. H. of R. varies in number from time to time, being determined by the decennial census. In the absence of specific congressional legislation affecting the basis (see further under UNITED STATES OF AMERICA). The elected chamber in the Parliament of the commonwealth of Australia (*q.v.*) is also called the H. of R., the numbers of members chosen being in proportion to pop. as shown by the latest statistics, but not less than five for an original state. Similarly there is a H. of R. in New Zealand, the members of which are elected for three years. Other countries with a bicameral legislature whose constitutions provide for a H. of R. include Colombia, Cuba, the Philippines, and Uruguay. The title H. of R. is synonymous with Chamber of Deputies, the name given to the lower houses of Bolivia, Chile, the Dominican Republic, Ecuador, Egypt, Peru, and Venezuela. The former Chamber of Deputies of France is now replaced by the National Assembly.

Repression, see under **PSYCHOLOGY**.

Reprieve, withdrawing of a sentence for an interval of time whereby the execution of a criminal is suspended, and may be granted either (a) by the Crown through the Home Office, or (b) by the court either before or after verdict. The grant of a R. is an entirely discretionary matter, but in two cases the court has no option,

and must grant a R., viz. (1) when a woman sentenced to death is pregnant; (2) when a prisoner becomes insane after judgment. See also **PARDON**.

Reprisals, internationally illegal acts to which by a rule of convenience of international law (*q.v.*) a state may resort in order to secure justice when it is otherwise not obtainable. If, for example (to argue from an actual case), one state has granted a monopoly in violation of a commercial treaty (*q.v.*) with another state, the latter may retaliate by seizing the vessels of the former and laying an embargo upon them. The moral justification for R. against a state is that the difference which is settled by such a quasi-belligerent mode of proceeding is a difference created by that state's own international delinquency, and, according to the better opinion, R. are admissible solely for international delinquencies (Oppenheim). Like pacific blockade (see on this, Westlake, *Collected Papers*, 1914) and retorsions, they fall short of actual war, though it is doubtful whether they would not inevitably be followed by a declaration of war from the state against which they were directed, if that state were a modern civilised power. But, as a rule, R. and analogous retaliatory acts have been committed only against minor states. Retorsion is distinguishable from R. in that it consists in retaliation in kind for unfriendly or inequitable acts which are not at the same time illegal in international law. It is an express provision of The Hague Convention that any compulsion of the pop. of occupied ter. to give information about the army of the other belligerent or about his means of defence is forbidden (Article 44, Hague Convention IV., 1907). This rule is an extension of Article 23, which prohibits the compulsion of enemy subjects to participate in the 'operations of war' against their own country. The prohibition is vague, but it was a harsh extension of its meaning which the Gers. claimed when they deported thousands of Belgian and Fr. men and women to Germany and compelled them to work there. In the Second World War the Gers. carried R. beyond all laws, moral and international.

Reproduction, in biology, process by which individuals generate new individuals of the same species. All organisms are made up of cells, and all cells are produced by the division of pre-existent cells; this is the ordinary phenomenon of growth. Many organisms have the power of developing new structures to replace parts which have been lost (see **REGENERATION**). Again, most organisms possess special cells which, in certain circumstances, may develop into complete individuals. It is this latter process which is specifically called R. R. may be *asexual* or *sexual*. Asexual R. may be by fission, i.e. the division of an organism into two parts, or by budding, in which a portion of the organism is constricted and grows into a new organism,

which may separate or remain attached to the parent. Sexual R. involves the production of a cell called a zygote by the conjugation of two cells called gametes. The gametes may be sexually indistinguishable, in which case the conjugation is said to be *isogamous*. In heterogamous conjugation, which is far commoner, a male gamete, called a spermatozoon, fuses with a female gamete, called an ovum. Reproductive organs are differentiated for the production of the gametes, and when these are possessed by different individuals, there occur male and female sex. The conjugation of male and female elements is called fertilisation (*q.v.*). When the ovum develops without fertilisation, the phenomenon is known as parthenogenesis; this occurs in bees and in many plants. Many plants have an asexual mode of R. by the formation of spores. See BIOLOGY; CELL; EMBRYOLOGY; PENIS; PLANTS; SEXUAL SELECTION; VARIATION.

Reptiles (*Reptilia*), class of vertebrates which has much in common with birds, and included with them by Huxley in the primary group, Sauropsida, reptile-like animals. R. are cold-blooded, and have the skin covered with scales or scutes, whence they are classed as *reptilia squamata* in contradistinction to the smooth-skinned *batrachia* (*q.v.*). They are oviparous or ovoviparous, and are all air-breathers, which distinguishes them from the Amphibia. According to herpetologists, the five chief groups or orders of existing R. are: Chelonina, tortoises, and turtles; Lacertilia, lizards; Ophidia, snakes; Rhynchocephala, represented by a single New Zealand lizard (*Hatteria*); and the Crocodilia. R. reached their maximum development in an earlier geological period, and the Mesozoic era is sometimes called the Reptilian Age, hence fossil forms are very numerous.

Repton, par. and vil., Derbyshire, England, on the Trent, 5 in. E.N.E. of Burton; it has a public school, founded as a grammar school in 1557 and reorganised in 1874. The kings of Mercia had a palace at R., and three kings were buried at the monastery there. The par. church contains a Saxon crypt. Pop. 2300.

Republic (Lat. *res publica*, the state; from *res*, affair, and *publica*, public), state in which the sovereignty does not reside in an hereditary ruler, but in the people themselves, or a section of them. Thus a R. may be aristocratic, oligarchic, or democratic. The earliest Rs., those of Greece and Rome, were in their essence oligarchic, as were the medieval Rs. of Venice, Florence, Genoa, and other It. tns. The United Provs. of the Netherlands formed for a short period in the sixteenth century a R., and in the seventeenth century Great Britain was from 1649 to 1660 a R. in name. France has been a R. from 1793 to 1895, from 1848 to 1853, and from 1870 to the present time. Mexico has been a R. from 1824 to 1863, and from 1867 to the present time. Spain has been a R. from 1873 to 1874, and again from 1931; Portugal from 1910, present Poland from 1916, Russia from

1917, and China from 1912. With the exception of the three Guianas, all the S. Amer. states are Rs. San Marino and Andorra are the smallest Rs. Switzerland and the U.S.A. are federal Rs., that is, separate Rs. bound together by a treaty, and having a central authority with the power of issuing laws, etc. The W. Ger. It. (1949) is a federal It. Practically all modern Rs. have a written constitution, an extensive franchise, and choose the executive indirectly, as by some form of electoral college; or by the legislature, as in France and Switzerland. Legislation is vested in two co-ordinate Houses, while the judiciary forms a separate branch of gov., invested with power to pronounce on the constitutionality of laws and of executive Acts. See also under CONSTITUTION.

Republican Party, one of the two major political parties of the U.S.A. The name was originally used as a second name for the Democratic party (*q.v.*), founded by Jefferson. In 1828 a group under John Quincy Adams and Henry Clay seceded, styling themselves 'National Republicans' or 'Whigs.' The modern R. P. was founded in 1851 by a union of N. Whigs, Democrats, and Independents, all of whom were opposed to slavery. In 1856 it held its first national convention at Philadelphia, and nominated John C. Fremont for the presidency. James Buchanan, Democrat, was elected, securing 174 votes, but the R. P. received 114 for its nominee. In 1860 the R. P. succeeded in securing the election of Abraham Lincoln (*q.v.*). After the civil war the R. P. was the dominant party in the country. It controlled the presidency and Congress till 1874, when a Democratic House of Representatives was returned, but retained the presidency until Cleveland's election in 1884. The R. P. was again in power from 1888 to 1892. In 1896 the party controlled Congress and the presidency once more. It was only the Roosevelt secession of 1912 (see under BULL MOOSE) which enabled the Democrats to gain control of Congress and secure the election of Woodrow Wilson; but a Republican Congress elected during his presidency effectively blocked many of his measures. In 1920 the R. P. regained the presidency and kept it until 1932. In 1932, 1936, 1940, and 1944 a Democrat was returned to the presidency (Franklin D. Roosevelt, (*q.v.*)), and in 1949 another Democrat was elected (Harry S. Truman, (*q.v.*)).

For years after the civil war the R. P. profited by the claim that it had saved the union, though many N. Democrats had fought beside N. Republicans during the struggle. Later the two parties appeared to be distinguished chiefly by their attitudes on currency and tariff reform. Cleveland stressed a tariff for revenue only, while the R. P. generally wanted a high protective tariff to aid Amer. manufs. Following the civil war, the R. P. also tended to support the strengthening of the central gov. as against the local spirit of the separate states, since the S. states naturally took every

advantage of federalism to salvage something from their defeat in the war.

After the initiation of Roosevelt's New Deal (q.v.), the Republicans, while continuing their campaign against 'state rights' emerged as a party opposed to the centralisation implicit in the 'welfare state'; in this view, however, they were followed by a considerable section of the Democrats.

At the end of the First World War, the R. P. opposed the entry of the U.S.A. to the League of Nations. Since the Second, its more right-wing elements have been more eager than the main body of the Democrats to participate in specific spheres of international politics where the paramount objective has been the prevention of Communism, e.g. China. Therefore, even on foreign policy, the two parties have no rigid dividing line, though possibly more elements of isolationism survive within the R. P. than within the Democratic. As the opposition, the R. P. since 1945 has been more anxious to criticise lavish gov. expenditure than the Democratic, and some Republicans have frequently objected to the granting of large-scale loans to Socialist countries, though their more moderate leaders, e.g. Vandenberg (q.v.), have generally approved presidential policy on these matters.

It is indeed hard to distinguish between the R. P. and the Democratic, even on the broadest political questions. The R. P. has gained much support from big business in the past because of its tariff policy; the Democrats have won many industrial workers' votes since the Roosevelt administration's New Deal. But voting in America is based to a large extent upon locality, historical association, and (particularly in presidential elections) on personal appeal, and both parties contain 'left' and 'right' groups, and rarely vote as a body, except when in opposition. In addition, large groups within the U.S.A., e.g. Prohibitionists, Unions, Baptists, Rom. Catholics, have frequently played off one party against the other in order to obtain as large a part of their own sectional programme from both, regardless of national or international issues.

Republican River, The, formed by two branches rising in E. Colorado, U.S.A., and flowing E. and S.E. to Junction city, Kansas, where they unite with other streams to form the Kansas R. Length 520 m.

Reputation, or Renunciation. In the law of contract a party who repudiates the contract before the time for performing it has come thereby commits a breach which entitles the other not only to consider himself discharged from doing anything under the contract, but at once to sue for damages or specific performances (see *EQUITY*).

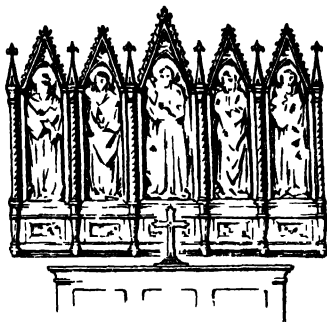
Requena, tn. of Spain, in the prov. of Valencia, 48 m. by rail from Valencia city. The spas of Fuente Podrida are near by. Much of the medieval tn. remains. Vines, fruit, silkworms, and saffron are cultivated. Pop. 21,100.

Requiem (Lat. *requiem* (acc.), rest), celebration of the Mass for a person or

persons departed. The name is derived from the first words of the introit, *Requiem eternam dona eis, Domine*.

Requisition, Military, see under **LAND FOR MILITARY PURPOSES**.

Reredos, in churches, ornamented wall or screen at the back of the high altar. It usually consists of a screen detached from the wall, and is elaborately adorned



REDOS

with sculpture and tracery. Originally the R. was a hanging of tapestry or silk; later it became more substantial, but could still be moved, and was only used at certain festivals.

Reremouse, see **BAT**.

Reschenschajdeck, Alpine pass in the It. Tyrol, at an altitude of 4900 ft. It is near Reschen vil., on the borders of Italy and Switzerland, and the route was known in pre-Rom. times.

Rescripts (Lat. *rescriptum*, answer), in Rom. jurisprudence, answers of the emperors and popes to questions officially put to them. During the early empire they constituted one of the most important sources of Rom. law. During the third century they rapidly increased and superseded the responses of the jurists, the privilege of giving such no longer being conferred on the latter. See also **DECRETAL**.

Rescue: 1. In law, forcibly and knowingly freeing another from arrest or imprisonment. If the original offenders be convicted, the rescuer will be punishable as for the same offence; if not convicted, the rescuer may still be punished as for a misdemeanour. To R. or attempt to R. a convicted murderer renders the offender liable to penal servitude to the extent of life. For **Pound Breach**, see under **BREACH**. 2. Deliverance from danger or death. R. work is carried out by a number of organisations specially equipped for certain types of emergency (see below). Organisations such as the various vigilance societies, church groups, and the Salvation Army conduct 'moral R. work,' campaigning against prostitution (q.v.), drunkenness (q.v.), etc.

Fire Rescue.—The primary duty and

purpose of every fireman is to save life: the saving of property is a secondary consideration. Each item in the varied equipment, from a small hand axe to a 150-ft. turntable ladder, may play an important part in the saving of life from fire. The methods of effecting a rescue vary according to circumstances. It may be necessary only for a fireman to enter a building, calm distracted occupants, and lead them to safety by a safe route. Generally, however, lives are saved by firemen using ladders (see under FIRE BRIGADES AND FIRE FIGHTING) to gain entry above the ground floor when staircases are obstructed by fire or, more commonly, smoke. In order to enter a building which is filled with smoke or toxic fumes, a fireman may use breathing apparatus (see OXYGEN APPARATUS).

Mines Rescue.—Under various Coal Mines (Rescue) Regulations, it is necessary for central rescue stations to be provided and maintained. A central rescue station is situated in a central position in a coal-field so that it can operate at collieries within a radius of 15–20 m. It must be fully equipped ready for immediate operation with a sufficient number of fully trained rescue workers. One of the principal pieces of equipment for this work is the breathing apparatus (see OXYGEN APPARATUS) provided with oxygen for two hours because of the distances often to be travelled underground before actual rescue work can begin.

Civil Defence Rescue.—The air attacks on civilian pops. during the Second World War necessitated the opening of new fields in R. work. No highly complicated or technical apparatus was required, except a sound knowledge of the use of shoring, damaged buildings, tunnelling under debris, etc., in order to reach and give aid to the victim.

For maritime R. work, see LIFE-SAVING AND RESCUE APPARATUS; for rescue from drowning, see HUMANE SOCIETY, THE ROYAL, and SWIMMING; for moral R. work, see under VIOLANCE SOCIETIES.

Research, see AGRICULTURAL RESEARCH; MEDICAL RESEARCH; NATIONAL PHYSICAL LABORATORY, THE; NATIONAL DEVELOPMENT RESEARCH CORPORATION; NAVAL SCIENTIFIC SERVICE, ROYAL; PHYSICAL SOCIETY; RESEARCH ASSOCIATIONS, INDUSTRIAL; ROYAL SOCIETY, SCIENTIFIC AND INDUSTRIAL RESEARCH, DEPARTMENT OF.

Research Associations, Industrial. The growth in importance and numbers of these associations and their increasing influence on the scientific and economic life of the country are a landmark in modern industry. The total expenditure of these associations in 1917 was nearly £2,000,000, of which £800,000 was provided by the Dept. of Scientific and Industrial Research. The gov. scheme for co-operative industrial research was initiated by that dept. in 1918, its purpose being to stimulate the industries of the United Kingdom to undertake co-operative research as a means of increasing their efficiency. R. A. under this scheme are registered companies,

limited by guarantee of a nominal sum and working without the div. of profits in the form of dividends; their income is from subscriptions of individual members, supplemented by gov. grants. There are now thirty-eight R. A. covering most of the prin. industries of the country. They are autonomous bodies free to decide their own policy for the development of their research programmes and the use to be made of the results of their research. Membership is open to any Brit. firms in the particular industry, subject to the approval of the Council of the Research Associations.

Reseda, genus of dicotyledonous plants, typical of the order Rosales, and found in Europe and round the Mediterranean. Two species occur in Britain: *R. lutea*, the base rocket or dyer's weld, and *R. luteola*, the wild mignonette. *R. odorata* is the common garden mignonette cultivated for its sweet-scented flowers.

Reservation of the Blessed Sacrament, practice of preserving the consecrated elements after the eucharistic ceremony, for administration to the sick and for purposes of devotion. It goes back to the earliest Christian times, when portions of the eucharistic bread were sent or taken by the deacons to the sick and absent (Justin Martyr, *Apol.* i. 87). Tertullian uses the word *reservare* in the sense of retaining the Blessed Sacrament (*De Oral.* xix.). On the other hand the practice of keeping the Blessed Sacrament in churches that the devout might pray before it cannot be traced with certainty further back than A.D. 1000. After the tenth century the common practice in England and France was to suspend the Blessed Sacrament over the high altar in a dove-shaped vessel. The tabernacle of modern times was known, but not by any means universal before the Reformation. Since the Reformation R. was not practised outside the Rom. Catholic Church until fairly recent times. The revision in 1928 of the rules concerning R. in the Anglican Book of Common Prayer and intended to permit it, was one of the reasons for its rejection by Parliament. See H. Thurston in *The Month* (1907), 377 and 617.

Reserve, Army. The principle upon which modern military systems are based is that, for financial reasons mainly, states cannot maintain in peace the number of troops they would require in war. They therefore give soldiers the training they consider necessary to fit them for war, and then pass them to a reserve force, where they complete their service. Whilst in this reserve they perform arm. training to keep them up to standard. In countries where military service is compulsory and practically universal, the constitution and personnel of such reserve troops are susceptible of more exact treatment than in other countries. In the Brit. service, according to the regulations in force in 1939, a man enlisted on a twelve-year engagement, seven of which were normally spent with the colours and five with section B of the A. R. During his reserve service he was paid a small retaining fee.

A limited number of section B reservists formed section A, and were liable for service at shorter notice than those of section B. At the end of twelve years all reservists were discharged, but many might re-engage for section D, which had other liabilities for service. Such men might serve up to forty-two to forty-five years of age, according to whether they were skilled or unskilled. In 1908 a special reserve was formed from the previous militia, but in 1921 the title militia was reintroduced and special reserves disappeared. This militia was not, however, maintained in Great Britain or N. Ireland between the two world wars. In 1924 a new force was formed—the supplementary reserve. It formed part of the A. R. as is law militia. It was organised in three categories: A, personnel of transportation units of R.E. required to undergo training in peace; B consisted of other personnel required to undergo training in peace; C consisted of personnel not required to undergo training in peace. Category B was mainly raised and administered by the T.A. and was affiliated to T.A. units for training, etc. Personnel of A and B enlisted for four years and those of C for two, three, or four years in accordance with requirements. Men between nineteen and forty-one were eligible. When called for service they became in all respects soldiers of the regular forces. *See MILITIA.*

Reserved Occupation, in relation to military service. At the beginning of the Second World War, as also under the Derby scheme of recruiting (*see under CONSCRIPTION*) and later in the First World War, there was a schedule of R. Os., which provided for a wide variety of men in different occupations whose call up for military service was deferred according to their particular age group. In the Second World War that plan operated until about the end of 1941, when the gov. gradually dropped the system of 'block reservations' or deferments and introduced a system of individual deferments according to the importance of the man concerned to industry. The system provided for exchanging men; thus an elderly worker would be put into the place of a key worker of younger age. After 1946 coal-mining, agriculture, and certain occupations connected with the building industry were the only R. Os.; and after Jan. 1, 1947, deferment, broadly speaking, was according to the circumstances of particular cases and not on the grounds of their importance to industry. In March 1950 all control of engagements was ended. *See Report of the Ministry of Labour and National Service for 1939-46.*

Reserve (Reservation), areas reserved for occupation by natives, especially Africans and Amer. Indians. In Africa the R. policy has been adopted in the Union of S. Africa, the Rhodesias, and Kenya (notably the Masai and Kikuyu Rs.), and it is a consequence of the alienation of lands to Europeans. In Brit. African terts. other than those mentioned alienation has had relatively less effect on

native life, as, for example, Nyasaland, though Rs. may also be seen there. There are none in W. Africa where conditions demographically are entirely different. The principle of segregation has two purposes: the reservation of land for European occupation and the eventual exclusion of the native from European-owned lands, save for his employment as wage-earner or tenant labour. Segregation here may be said to be in full operation in the sense that the limits of European and native areas respectively have now for some years just been fixed; but there is not complete territorial separation, for the holdings of the two communities are in most cases intermingled. In the Union of S. Africa the Transkei Terts. and a part of Zululand may be said to constitute homogeneous native blocks; in S. Rhodesia there are some large blocks of native land, but a number of Rs. are interspersed in European areas; but the highlands of Kenya constitute a more or less homogeneous European block. From the employers' point of view the native reserve is useful as a 'shock absorber' in that it provides for the unemployed, the aged, or infirm without any charge on the gov.

Opinion in S. Africa tends to lay emphasis on the existence of the Rs. as a factor in the policy of social segregation (or *apartheid*) rather than on the influence it may have on the supply of labour. The policy which regards the reserves as the suitable field within which the native is to work out his social and economic advancement is in some quarters merely a doctrine of expediency, but in others it represents a genuine belief that the native can in this way secure for himself the best position available to him under the conditions introduced by a dominant and competitive white civilisation; but against this it seems evident that the R. can offer only limited possibilities for any substantial improvement in the conditions of those who live in it; and in some of the Rs. there is marked congestion. *See further under SOUTH AFRICA, UNION OF.*

On the Rs. in Kenya *see KENYA, White Settlement.* On Indian reservations in America *see AMERICAN INDIANS, Conditions on Reservations.* For reservations for animals, etc., *see GAME RESERVES; NATIONAL PARKS.*

Reservoirs for storage of water are classed as 'storage' or 'impounding' R. when they are intended to store up water during wet weather for use during drought, and as 'service' R. in the case of comparatively small covered R. supplying purified water by gravity to tn. mains.

Storage or Impounding Reservoirs.—Wherever possible natural lakes are adapted, but where they do not exist artificial lakes may be created in a natural drainage area by constructing a dam across some portion of a valley; in more level plains advantage is taken of depressions as sites. The main consideration of cost of constructive work is naturally a great factor in the choice, and the geology, as well as the configuration of the land, must be carefully surveyed, as

it affects not only the retention of the water, but also determines largely the cost of labour. A synclinal valley is a favourable site, as water would percolate through the strata into the reservoir; an anticlinal valley would allow leakage. Again, sand, gravel, or limestone forms a leaky substratum unless artificially covered, while a clay bed, naturally, is excellent. The supply of water must be carefully calculated; a natural 'catchment basin' is mapped out; its rainfall noted both as to quantity and period; the quantity of water carried by the streams and its fluctuation measured. In hilly country the height of the reservoir site needs careful selection; too high a position not only requires greater strength in all delivery pipes owing to increased pressure, but the supply of water is more sensitive to rainfall, thus giving a precarious supply at one time, while flooding, necessitating expensive construction work, will occur at another; a lower site, avoiding periodic scanty supply, may yet allow flooding, and be still open also to the disadvantage of the great eroding force of supply water. The lower the site the better, so long as sufficient pressure can be maintained. The purity of water depends on many factors, but it is greater as a rule the higher the site and the more remote from populous districts. The supply may, however, be brought from a region by aqueduct to a reservoir in an economically selected site. On plains R. may be constructed alongside rivers, from which the water is pumped. The retaining walls or dams are built of earth, masonry, mass concrete, reinforced concrete, and other building materials. Earth forms a most substantial dam, is economical, and decidedly better than masonry in countries subject to earthquakes; it is not used on solid rock foundation or in dry climates. In America the wider variety of climate has led to many devices. Loose rock is piled up with careful filling of interstices; it may contain a vertical steel diaphragm or one of reinforced concrete. The whole is then sheathed with tarred planking or covered with earth or masonry. Crib dams, formed of a framework of logs, bolted or wired, filled with loose rock, are used, but are naturally not permanent.

Earth Dams.—This type may be built in layers of homogeneous material, with a core of puddled clay. The inner slope is usually 3 to 1, the outer 2 to 1, the latter often with one or more benches or berms as extra security against slipping. The core is founded on an impervious foundation and reaches to the top of the dam. The core is embanked on either side with selected earth carefully laid and worked. The inner face of the dam is carefully pitched with cobblestones, paving, or concrete slabs, to protect it against erosion—the pitching being stronger in the upper portion, where wave action is strong. Here the bank is usually steeper, so that spray recoils instead of topping the parapet and falling on the outer slope. The outer slope is usually covered with grass to bind the surface and protect it against weathering and spray.

Masonry and Mass-concrete Dams.—These must be on absolutely firm foundations, or future settling may lead to cracks or fissures. Their stability and the form for resisting water pressure are a matter of calculation. The weight of material itself must be considered, and extra pressure due to wind action as well as for varying level of water. The limits of pressure are found for the full and empty reservoir. In cross section the wall is so arranged that the centre of pressure at any level shall be within the middle third of the thickness of the wall.

Reinforced Concrete Gravity Dams.—These consist of a slab of reinforced concrete inclined at 45° to the horizontal and supported from a raft foundation by reinforced concrete wing walls. The downward thrust of the water holds the dam in position and prevents the comparatively light structure from overturning, but precautions against sliding of the dam are essential.

Arched Dams.—Such dams are made of mass concrete or other material and are constructed between the vertical or steeply sloping rock sides of a valley against which the ends of the dam abut.

Waste-weirs.—These are provided to carry off surplus water. They are constructed in solid ground at the side of the earth dam, or may be solid masonry structures at the end. In any case, it is usual to arrange both ends of the waste-way, escape, or spill-way well clear of the dam; with masonry dams the parapet may be so constructed as to allow of waste along the whole length; or any portion may be so constructed. The ogee shape is sometimes used, or a stepped fall, or a wide-crested fall. It is not usual to have any obstruction whatever, though various forms of sluice-gates are used to regulate the height where seasonal fluctuation is great. By-wash channels are used when for any reason it is desirable to divert water from streams entering the reservoir. Regulation is supplied by means of sluice-gates, or sometimes, when flood-water is to be excluded, automatically by a gap leading into the supply tunnel; beyond the gap the stream course is continued at a lower level, and the flood waters leap to this.

Outlet.—The sluices may be laid through the dam or through the ground outside—a safer plan; or, best of all, through the solid foundation below the dam. The pipes are usually laid in culverts to allow frequent inspection, and lead from a suitable depth in the reservoir, say two-thirds up the embankment. From this level a separate siphon-pipe may lead to the bottom for use if necessary. The valve or lower chamber, where the water may be admitted from the reservoir, leads to the upright pipe leading to the outlet sluice; these control devices are built away from the dam, a small bridge leading across. The lower may contain screens for straining the water.

See also WATER SUPPLY and under HYDRO-ELECTRIC POWER.

See W. P. Creager, *Engineering for Masonry Dams*, 1929; F. J. Taylor,

Modern Waterworks Practice, 1929; Institute of Civil Engineers, *Interim Report of the Committee on Floods in Relation to Reservoir Practice*, 1933; G. Bransby-Williams, *Storage Reservoirs*, 1937; Institute of Civil Engineers, *Code of Practice for the Design and Construction of Reinforced Concrete Structures for the Storage of Liquids*, 1938.

Resht, or **Rasht**, tn. of Persia, cap. of the prov. of Ghilan, 150 m. N.W. of Teheran. It is the centre of a military area, and has a regular air service with Teheran and Bushire. Silk, shawls, and carpets are made, and rice, fruit, tobacco, cattle, and sheep are exported. Pop. 122,000. Enzeli, its port, is 14 m. to the N.W. on the Caspian Sea.

Residence, *see* DOMICILE.

Residual Mountains, *see under* MOUNTAINS.

Residuary Legatee, *see* LEGACY.

Resilience, term used mainly in engineering to describe the work done by a body, after it has been subjected to stress, in returning to its original shape, or the work done to produce this stress in a body within its elastic capacity.

Resin, one of a class of substances obtained as exudations from certain plants. The secretions exude in globules, which harden on exposure to air. The resins are soluble in alcohol, ether, and the volatile oils, but are insoluble in water. They are translucent and brittle, showing a conchoidal fracture; they are readily fusible and inflammable, and are bad conductors of electricity. The hard resins are chiefly used as varnishes; such are copal, mastic, dammar, lac, and sandarach. The soft resins contain essential oils, are odorous, and can be moulded by hand. They are chiefly used in medicine in the form of ointments, etc.; such are turpentine, copaiba, storax, and frankincense. Some Rs. are obtained as fossils, e.g. amber, fossil copal, kauri gum. *See also* PLASTICS.

Resina, tn. in the prov. of Naples, Italy, 4½ m. S.E. of Naples, on the W. slope of Vesuvius and on the bay of Naples; it is famous for its *Lacrima Christi* wine. The electric railway up Mt. Vesuvius starts from here. Pop. 37,600.

Resistance, in electricity, the property of an electrical conductor by reason of which energy is expended in it when a current flows or a transfer of electricity occurs; or, in other words, the extent to which an electric conductor resists the passage of an electric current. The resistance is constant under constant physical conditions and varies according to the material of which the conductor is made.

Resistance Furnaces, *see under* METALLURGY, *Electro-smelting*.

Resistance Movements, term which came into use in the Second World War to denote the underground organised resistance of the peoples of European countries occupied by the Gers. Such resistance took the form of irregular fighting forces, such as the *maquis* or *militie patriotiques* of France or the *partisans* of Russia or Yugoslavia; but the term

may also be said to embrace purely civilian activities, such as in Belgium, where an underground press was estab. to place on record the robbery and pillage practised by the Ger. occupation authorities. Politically most R. M. became associated with the left. *See further under* BELGIUM, *History*; GUERRILLAS; EUROPE (HISTORY), *Allied Invasion of Normandy*; FRANCE, *History*; MIHAILOVICH, DRAŽA; TITO, BROZ; YUGOSLAVIA, *History*.

Resistencia, tn. of Argentina, cap. of Chaco ter., on the Paraná R., opposite Corrientes. Its port, Barranqueras, is 1 m. distant. It is linked by rail with Santa Fé. There are large European settlements of colonists who are chiefly engaged in cotton growing, and the production of quebracho and other forest products, and in stock-raising. Pop. about 50,000.

Res Judicata, in law a question which, having been settled by a final judgment, is disposed of for all time. No question of fact that has once been finally determined in a legal tribunal can ever be reopened in a court of law. But a final recorded judgment is evidence only of the actual state of facts it purports to settle, and not of every piece of evidence that might or might not have guided the court in its decision, though it is conclusive evidence of facts which are necessarily imported in the judgment; and again, a final judgment is only final as between the original parties to it or their successors, no stranger to the suit being barred from getting the same issue set down for trial.

Resolution: 1. Formal decision of a legislative or corporate body; or of a meeting or any association of individuals; or a formal proposition brought before a public body or meeting for discussion and adoption. In the House of Commons taxes and duties are introduced as 'resolutions' before being included in the Finance Act; and money bills are debated in the form of Rs. before coming on for second reading (*see* PARLIAMENT, *Bill*). A 'special resolution,' confirmed by the court, is the statutory preliminary to the extension of the powers of a company. 2. Term used in harmony for the process by which a discord is made to pass into a concord.

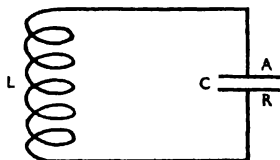
Resolution of Forces, *see* COMPOSITION (in mechanics).

Resonance, in physics, the setting up of vibrations in a system by an applied periodic force having a frequency equal to one of the natural frequencies of the system. If there is little damping of the vibrations their amplitude may become very large even if the inertia of the system is great and the applied force small. This may be illustrated by the board of a child's swing. If the angle through which it swings is not too large each to-and-fro movement occupies nearly the same period of time; so the apparatus has its own natural frequency of vibration; that is to say, if left to itself it will always make the same number of to-and-fro movements per min. By applying a series of

gentle taps to the swing at regular intervals it can be put into forced vibration, and made to swing in time with the applied pushes. Suppose, for example, that its natural frequency is $\frac{1}{2}$ per sec., so that each to-and-fro movement requires 2 sec. If the taps are applied at intervals of $\frac{1}{2}$ sec. (say), the first few blows will drive it somewhat to one side, and it will then rebound from each successive one, moving with a frequency of 3 per sec. In general, unless the taps are heavy, the forced vibration will be only of small amplitude, or angle of swing; but if the frequency of tapping is reduced until it is approximately equal to the natural frequency, each blow will fall at such a time that it reinforces the motion of the board. In consequence, even if the blows are light, a movement of considerable amplitude can be built up, and the swing, under these circumstances is said to show R. This example is chosen by way of illustration because the reader can easily verify for himself what happens when the period is low, as in the example; but in many cases that are of importance the frequencies are too high for direct observation without special aids. R. may occur as the result of the impact of sound waves, as it does when a key of a piano is held down to release the damper on one of the wires and the same note is sounded or sung in the vicinity; after the sound from the source has died away, the piano wire can be heard emitting the note. By using hollow vessels designed to respond to notes of particular frequencies, Helmholtz applied the principles of R. for the analysis of complex musical sounds. R., however, is frequently troublesome because of the engineering problems it presents. Bridges and other structures, for example, may be endangered if they are subjected to periodic forces of frequency close to the natural frequency of some part of their structure. Such forces may result from vibrations due to traffic, from the regular step of soldiers marching (hence the order to break step in crossing a bridge), or from gusts of wind. To avoid R., engineering structures must be designed in such a way that their natural frequencies are far removed from those of any forces that are likely to be applied to them, and so that any vibrations set up are quickly damped out.

A phenomenon that is very similar to mechanical R., and to which the name R. is also applied, occurs in some types of electrical circuits. Suppose, for example, that a circuit consists of an inductance L and a condenser of capacity C , and that, at a certain instant, the plate A of the condenser is at a higher potential than B. Current will then begin to flow from A via L to B. Owing to the inductance, however, the current grows relatively slowly from its initial value of zero, and further, when the plates A and B have reached the same potential, the current does not immediately drop to zero, but continues to flow for a time, raising the potential of B above that of A. When, therefore, the current ceases momentarily, it begins to flow again in the reverse

direction, and again raises the potential of A above that of B, after which the whole cycle of changes may occur again and again. Such a circuit has thus a natural frequency, whose value depends upon the magnitudes of the inductance and the capacity, and if a current is induced in it the current will oscillate with this natural frequency until its energy is used up in generating heat in the conducting wires of the circuit. If a coil carrying an alternating current is placed close to L , an alternating current will be induced in the circuit, and, if the frequency of the current in the coil is close to the natural frequency, it will occur, and the current in the circuit may become



RESONANCE IN AN ELECTRICAL CIRCUIT

considerable. If the capacity of the condenser is deliberately adjusted to give R., the circuit is said to be tuned to the frequency of the other current. Such tuned circuits find numerous applications in work involving high-frequency currents (e.g. in radio), and are used in most stages of radio and television receivers to select and respond to the wanted frequency. It occurs not only in tuned circuits where the inductance L and capacity C are concentrated in a small space, but also in aërials (q.v.). A length of wire has both inductance and capacity distributed along it, and thus will resonate to a frequency determined by these factors. When suspended well clear of the ground this frequency is substantially related to the wire length (approximately $\frac{\lambda}{2}$),

which resonates electrically in the same way as does a violin string mechanically. Resorcin, or Resorcinol (*meta*-di-hydroxybenzene), $C_6H_4(OH)_2$, obtained by fusing benzene-*meta*-di-sulphonic acid with potash. It is a colourless solid, crystallising in needles which melt at $119^\circ C$. It dissolves readily in water, alcohol, and ether. When heated with phthalic anhydride and the product dissolved in caustic soda, a solution is obtained which exhibits a green fluorescence when diluted. It is used in preparing fluorescein, eosin, and various azo-dyes; it is used for preparing ointments for chronic skin diseases, and, fused with an equal quantity of iodoform, as a dusting-powder employed in surgery. It has also been used as a constituent of hair-restorers, and as a cure for 'blackheads.' It stains may be removed with citric acid.

Respighi, Ottorino (1879-1936), It. composer, b. at Bologna. He studied com-

position and orchestration with Rimsky-Korsakov at St. Petersburg in 1901. In 1902 he took an additional composition course with Bruch in Berlin. His first opera was produced in 1908. In 1913 he was appointed prof. of composition at the Accademia di Santa Cecilia in Rome and toured Italy as conductor of his own works. In 1919 he married his pupil Elsa Olivieri-Sangiuliano, a composer and singer, and from about that time he began to take a keen interest in old It. music and the church modes. He was appointed principal of the Accademia in 1923, but resigned in 1925, though retaining the composition professorship. His operas include *Belfagor* and *La Flamma*. He wrote the music for the ballet *The Birds*, and wrote symphonic tone-music on Rome. His impressionist music and his stark clarity of expression greatly influenced It. music.

Respiration, act of breathing with the lungs; more generally, the interchange of gases within and without the living organism, oxygen being absorbed into the body and some of the products of combustion, viz. carbonic acid and water, being removed. In unicellular organisms oxygen is absorbed over the general surface, but in the more complex animal types special respiratory organs are present. In man the air enters the nose or mouth, passes to the pharynx, and, the epiglottis being open, through the larynx (*q.v.*) into the trachea or windpipe. The air, now being warmed to some extent, divides right and left into the bronchi, then into the secondary and tertiary bronchi and into the bronchioles, or small divs. of the bronchi. At the end of the smallest, bronchi sacs called alveoli occur. Each of these sacs is lined with epithelium, and between the epithelium and the elastic wall of the sac is a network of small blood-vessels. Across the epithelial layer of the air-sac and the endothelial layer of the capillary wall the interchange of gases takes place between air and blood. The collection of alveoli at the end of each bronchus is called a lobule, and the lobules, with the connective tissue in between, make up the lung. The movement of breathing is initiated by involuntary stimuli, which cause the diaphragm to contract and other muscles to raise the ribs. The space occupied by the lungs is therefore extended, the elastic walls of the air-sacs expand, the contained air is rarefied, and a current is set up from the mouth and nostrils inward. When the inspiratory muscles have ceased contracting, they return to their relaxed condition, the pulmonary cavity becomes decreased in size, and the result is an expiration of air.

Respirators, appliances for purifying or warming inhaled air, inhaling medicated vapours, or supplying air when deficient. For industrial use the prevalence of dust or steel particles is countered by the use of a mask in which the air is filtered through a fine gauze, magnetised if necessary. In smoke-laden or gas-filled atmospheres an oxygen apparatus (*q.v.*) is used. When the respiratory muscles are

inactive, for example, through infantile paralysis, use is made of the 'iron lung' (*see* AEROTHERAPEUTICS). Oxygen is supplied from a cylinder to the crews of high-altitude aircraft. The development of chemical warfare (*q.v.*) in the First World War led to the introduction of military R., and 'gas masks' were supplied to the civilian pop., as well as to the armed forces, in the Second World War. In all types filters were devised containing materials to absorb the gases, and with the introduction of new gases new filters were required. The civilian R. was basically the same as the military R., except that in the former the filter was part of the mask, whereas in the latter it was a separate component linked by a flexible tube.

Respite: 1. In civil law, postponement by creditors of their claims in consideration of the debtor's proposals for a compromise. 2. Suspension of the execution of a criminal sentence (synonymous with reprieve, *q.v.*).

Responsandia, loan raised by the master of a ship upon the security of the cargo; the mortgage on the ship itself is known as *Bottomry* (*q.v.*).

Responsibility. It is the general rule in criminal law that every man must be presumed to be responsible for his acts until the contrary is clearly shown. (As to the exemptions, either total or partial, from criminal R., *see* under CRIMINAL LAW.) In civil actions for tort, or, in Scots law, delict (*i.e.* actionable wrongs, such as negligence, assault, libel), the general rule as to R. is rendered simpler by reason of the principle that tortious or delictual liability is absolute, and only in a few exceptional cases can be said to import any particular state of mind; hence coverture, insanity, infancy, etc., are not grounds for exempting a person from liability to pay damages. As to a husband's liability for his wife's wrongs, *see* under HUSBAND AND WIFE. As to liability in contract, *see* under CONTRACT. *See* also EVIDENCE.

Rest: 1. In music, interval of silence between notes; the signs of rest-duration are:

♩ ♪ ♫ ♬ For 3 4 5 6

corresponding signs of note-duration:

♩ ♪ ♫ ♬ ♭ ♮ ♯

2. Term used by the Bank of England and other banks for reserves.

Restaurants (Fr. *restaurant*, 'to restore'). Inns, taverns, hostleries, and 'eating-houses' have existed in most countries for a long time. But R. are a modern Fr. innovation, and are by no means at least in the country of their origin, a development of any of the above establs. France was, before the 1920s, pre-eminently the home of R. No other country could have supplied either the utilitarian basis of their existence, or the vivacious clientele to fill them. Many a pretentious

refreshment house in London, which for Englishmen is a restaurant, would be classed as a mere *traiteur* 'eating-house (keeper)' by a Frenchman. The true restaurant must have individuality in cuisine—e.g. the Café Riche was renowned for its sauce and soles, the Café Anglais for its *crêvettes bordelaise*, the Noël for its turtle soup—and a speciality in wines—e.g. the Café Riche surpassed other R. for its *bourgeois rouge*, the Café Anglais for its *château-lafite* (modern spelling, *château Lafite*), the Noël for its *fleurie* (now *fleurie*). Historical associations may not be essential, though many Parisian R. owe their international reputation as much to such associations as to their cuisines, while nearly all the older ones can boast an 'atmosphere' of their own. The first estab. actually called a restaurant, according to Legrand, was the house of one Boulanger in the Rue des Pouilles, Paris, 1765, where customers, including ladies unaccompanied by gentlemen, could get *bouillons* or *consommés* and *volailles au gros sel avec des œufs frais* served on marble tables as in *cafés*. The refreshments obtainable at this and the other 'R.' which quickly succeeded it were strictly regulated by law. At first they were all in the nature of invalid food—chicken, eggs, soups, thick and clear. Other more substantial viands were the right of the caterer, and it was not long before the multiplicity of R. ruined their own trade, and the proprietors were forced to enter into catering and increase their range of edibles. Prices charged were comparatively high, yet during the revolution R. multiplied rapidly, among the most celebrated of the earlier being those of Legarocque in the Jardin des Tuileries, in a room on the ground floor of which Marat, Couthon, and others are said to have continually met in secret conclave, and the Palais Royal estab. in 1808 near the renowned Frères-Provençaux (1786). A chance stimulus to the rapid rise of R. at this time was the fact that the very men to titillate the palates of the gastronomes of France were at large in the shape of *chefs de cuisine* of the great families ruined by the revolution. A host of R. were founded by these ex-chefs, among the most renowned being those of Beauvilliers, chef of the prince de Condé, and Robert, the chef of a farmer-general. The prin. Parisian R. early acquired a cosmopolitan fame, and it is only since the beginning of the twentieth century that the restaurant of even the foremost European and American cities have rivalled them.

The hist. of the restaurant in England is of much more recent date and few were known in London before the 1860s. Though the conception of the restaurant is Fr., it was the Ita. who first made their mark in London. But the true restaurant *quartier* of London has always been Soho, where between the two world wars It. monopoly was giving way to Czech, Swiss, Fr., Sp., and particularly Chinese *restaurants*, who in turn in the late 1940s were partially ousted by Uks. and Cypriots.

With the growth of democracy, the levelling upwards of incomes, and the consequent shortage of servants, the years between the two great wars saw a much greater demand for more R. But the type wanted had changed, for the emphasis was laid not so much on the personality of the *restaurateur* and his chef, nor on his *recherché* menus, but on the speed and efficiency of the service, while in the U.S.A. the cheap car and motor touring created still greater demand. Catering on such a large scale has produced the chain restaurant, such as Lyons (q.v.) and the Child's restaurant in the U.S.A., where a large portion of the food is pre-cooked at a central depot and then delivered in vans to the sub-branches. The introduction of rationing during the first years of the Second World War, coupled with a strict maximum price control of meals served, caused a great drop in the quality of meals served, and yet a remarkable increase in the attendance at R., so greatly were the earnings of the populace increased, and so occupied were women on war work in factories. The most lasting and salutary effect of Ministry of Food regulations was their right to withhold the granting of new catering licences to premises which had not taken adequate steps to enable them to cook food under hygienic conditions.

Other restaurant developments of the twentieth century are: (1) *On the Continent*. The huge popular-priced restaurant seating hundreds of people, and offering music and variety acts while the evening meal is in progress. (2) *In England*. The works canteen, legally obligatory to firms employing a certain number of staff, and often heavily subsidised by the employers for reasons of higher policy and because of the resulting increased output; the fully self-service restaurant; the coin in the slot machine automatic service; and finally, and most important, the semi-self-service, neon-lit, chromium-equipped milk bar, offering hot toasted sandwiches, sandwiches, waffles, soups, fruit juice, ices, and milk shakes.

See G. de la Reynière, *Almanach des Gourmands*, c. 1800; N. Newnham-Davis, *Dinners and Dinners*, 1893; G. Richards, *The Gourmet's Guide to Europe*, 1903; T. Burke, *Dinner is Served*, 1937; B. Capper, *Dining Out*, 1948; and T. A. Laxton, *Dining Round London*, 1948.

Rest Harrow, perennial shrub, *Ononis spinosa*, of the leguminous family. Of creeping growth or, sometimes, more erect, the taller is spiky, the lower covered with viscid hairs. The toughness of the rootstock is so great that it is said to arrest the harrow when clearing the ground—whence the popular name.

Restigouche, riv. of N.W. New Brunswick, Canada, forming the boundary between Quebec and New Brunswick for 50 m., and famous for its salmon. It rises in Victoria co., and flows 200 m. to Chaleurs Bay in the gulf of St. Lawrence. On it stand Dalhousie, the cap. of Restigouche co., with a trade in timber and tinned salmon, and Campbelltown with a similar trade. Its name is Indian for

'riv. in the shape of a hand,' since the riv. has five arms.

Restitution of Conjugal Rights. A husband or wife who without sufficient reason deprives the other spouse of his or her society, or neglects to perform his or her matrimonial obligations, may be sued for R. of C. R., and the court will grant a decree accordingly. In practice the decree is usually no more than a step in the direction of divorce, because if, as generally happens, the respondent refuses to obey the order, his or her disobedience is tantamount to desertion, and a petition for judicial separation may at once be presented, or, if the offending party has been guilty of adultery, the other may immediately sue for a dissolution. See HUSBAND AND WIFE; JUDICIAL SEPARATION; MARRIAGE; DIVORCE.

Restoration. In England and Scotland, re-estab. of the monarchy in the person of Charles II., May 29, 1660. In France the term is sometimes used to describe the reinstatement of the Bourbons in 1814.

Most historians consider that Cromwell's death in 1658 made the Eng. R. inevitable. Only the strength of his personality could hold together the widely divergent forces that had made the revolution, the 'godly' and the 'parliamentarians.' But it was the skilful handling of personalities and events by Monck (*q.v.*) and Hyde, later Lord Clarendon (*q.v.*), which brought about such a peaceful, speedy, and apparently complete R. Nevertheless, though the Stuarts were restored, the word R. does not really adequately describe the situation which existed in England after 1660. For it was not in fact a complete R. The events and ideas of the interregnum had ensured that the spirit of the age of Charles I., its manners, social groupings, and constitutional alignments, could never be restored in full. Gardiner's sentence gives the key to the constitutional position after 1660: 'It was a restoration of parliament rather than of the king.' Though episcopacy was restored, and Anglicanism retained its official monopoly, dissent was too well estab. to be eradicated. A large class of Royalists had been forced to sell most of their land in order to survive, with a fraction of their property, the burdens of sequestration, forcible composition, and the decimation tax; others had sold early in the war, to help Royalist funds. For these people, whose selling had been legally voluntary, the expected redress never came. After 1660 many names among the squirearchy were those of men who had skilfully changed sides in time to safeguard their accumulations, of speculators in army debentures who had been able to buy up Royalists with their fortunes, in the days of the Commonwealth, when land had been exceedingly cheap. The part played by the City of London in the R. has yet to be fully examined, but it seems clear that its attitude was of vital importance. After the R. the moral and financial power of the city is a visible major factor in political life. The literature of the R. period, especially that

of the theatre, shows a reaction against the austerity of the interregnum, when theatres had been closed. R. literature owes much of its form, its cynicism, and its extravagances of situation to Fr. influence, a direct consequence of the Stuart exile. The works of Dryden, Congreve, Wycherley, and Vanbrugh possess variously a charm, skill, beauty, and zest which has made them literary masterpieces; but they are very different from the simple, fresh, less sophisticated lyricism of Herbert, Lovelace, and Herrick. The reaction against Puritanism showed itself also in a licence which appeared not only in some of the literature, but outstandingly in society manners, such as had never been permitted at the court of Charles I.

In a number of ways an advance on the early Caroline epoch, the R. certainly differed from it considerably, and, as such, was bound to be a bitter disappointment to many. Clarendon's hist. gives a vivid picture of Royalist disillusionment at court. A comparison of the debates in the House of Commons during the reigns of the two Charles's, if it shows, after 1660, the beginnings of the modern party system, shows there also a distinct deterioration in moral principle since the days of Pym, Hampden, and Eliot. Politics had become a field for the ambitious money-maker. The *Verney Memoirs*, which cover both reigns, demonstrate the change in attitude of a co. family over the period. A striking imaginary reconstruction of the disillusionment and decay of the small Royalist squirearchy is given in the novel *None so Pretty*, by Margaret Irwin (1930). See also CHARLES II.; CLARENDON, EDWARD HYDE; ENGLISH HISTORY; MONCK, GEORGE; ROYALISTS; WAR, CIVIL. See Samuel Pepys's *Diary*; Evelyn's *Diary*; *The Commons Journals*; *Clarendon State Papers*, vol. III.; *Verney Memoirs*; Clarendon, *History of the Rebellion and Civil Wars in England, 1641-1660*, 1707; G. Burnet, *History of his Own Times*, 1721, 1900 (ed. O. Atry); M. Guizot, *Histoire de la révolution d'Angleterre*, 1826-27, 1843, 1850; D. Masson, *Life of Milton*, 1859-80, 1881-96; S. R. Gardiner, *History of England*, 1863-82, 1883-81, 1885-1900; A. Bryant, *King Charles II.*, 1931; and D. Ogg, *England in the Reign of Charles II.*, 1931.

Restoration, in architecture, repairing and rebuilding of portions of buildings in imitation of that which remains so as to make the new harmonise with the old. During the seventeenth century there is seen a gradual disappearance of all sympathy with and appreciation of medieval art. Horace Walpole with his 'Carpenter's Gothic' shows the beginnings of a revived interest in the next century. With the nineteenth century the movement became strong and well directed, as is shown by such societies as the Camden Society (1840), later the Ecclesiological Society. At this time the R. of arch. Gothic churches became almost a mania, and with this work the name of Sir Gilbert Scott is especially associated. It is now felt, however, that such R. can never be really successful, and it is attempted to

conserve rather than restore. *See* PROTECTION OF ANCIENT BUILDINGS AND PROTECTION OF ANCIENT MONUMENTS.

Restoration (of paintings), name given to various highly skilled processes applied to old paintings that have been lost or neglected for many years. Such paintings are invariably covered with varnish to protect the paint; often the only R. needed is the cleaning of this varnish, which turns yellow or brown with age and collects dust which would otherwise ruin the actual pigments. Microscopic examination of the varnish reveals a pattern in the cracks which identifies its consistency and the correct solvent to remove it. The solvent is usually 95 per cent turpentine, 5 per cent alcohol. X-rays and the polarised microscope are then used to distinguish the ages of different pigments and media, and it is in this stage that many hidden masterpieces have been discovered; the old painting may have been substantially altered or even covered with a different picture. Holbein's portrait of Sir Wm. Butts was altered to show Sir Wm. as an old man. Recently the tintometer has been used in restoring paintings. By reflecting light from small areas of the picture and from magnesium carbonate ('standard white') the colours of the painting may be matched and measured, to tell exactly how much the R. has altered them.

Restraint of Marriage. Contracts and conditions in wills or settlements *inter vivos* are void and against public policy. But where the restraint is only partial, it may be valid, e.g. the testator or sutor cannot validly provide that A shall forfeit all benefit under the will or settlement if she marry; but he may well deprive her of all benefits if she marry a particular person or class of person. A husband, however, is perfectly entitled to direct that his widow's interest in his property shall go over to someone else as soon as she marries again.

Restraint of Trade. The general rule of law is that agreements in R. of T. are void. It was this general principle of the law of contract, aided by the vaguer law of conspiracy (q.v.), that operated for some time against the development of trade unions (*see* INDUSTRIAL RELATIONS). At the present day no clause will be set aside by the court as being in R. of T. unless obviously unreasonable. The construction of such clauses very frequently arises in cases where an assistant in a profession or apprentice to a trade, being desirous of setting up either in opposition to or in the same neighbourhood or part of the country as his former partner or master, finds himself restricted by an agreement not to encroach. If the radius of prohibition be unreasonable, the court will not issue an injunction against him for encroachment, and will often invite the plaintiff to submit to more reasonable terms.

Restraint upon Anticipation, device of the courts of equity, intended to mitigate the hardships of the old common law, by which a married woman's property was protected from the husband's influence.

In medieval days under the common law of England all the property of a wife belonged to her husband. The first inroad the Chancery courts made upon the husband's position was the invention of a device whereby property might be vested in trustees for the 'separate use' of the wife (*see* on this HUSBAND AND WIFE). While under this device married women were enabled to dispose of their property as they thought fit, there was a danger that the husband might induce her to dispose of property and hand over the proceeds. The ingenuity of Chancery lawyers was therefore directed to protecting a wife against her husband's importunities, and Lord Thurlow (q.v.) is said to have been the first judge to discover the protection and to get it adopted by the Chancery courts. At the end of the eighteenth century it was well established that property could be settled upon a woman subject to a R. upon A., as it was called. By this device a woman was prevented, if she married, and so long as she remained married, from disposing of the *corpus* or capital of the property or from charging the income in any way before it was received. So the law remained until 1882, when the Married Women's Property Act provided that the property of a married woman should no longer go to her husband but form part of her separate estate. By that time, however, the clause providing a R. upon A. had become a settled precedent and continued to be used as a matter of common form, but in 1936 the legislature had come to the conclusion that the device of the R. upon A. was so prejudicial to the public interest that they passed an Act forbidding recourse being made to it in deeds, instruments, or wills executed after 1935. In 1949, owing to the introduction in the House of Lords of a personal Bill dealing with the estate of Lady Mountbatten, the gov. decided that the time was opportune for further legislation. In their view the experience since 1936 had shown that the device of the R. upon A. had become an anomalous and unjust anachronism, and they therefore introduced the Married Women (Restraint upon Anticipation) Bill with the object of preventing the further application of a legal device which, by a perversion of the old equitable doctrine, which was intended to protect married women, now operated almost invariably to their disadvantage by preventing them, so long as they remained married, from dealing with their property as their own. The Bill put an end to the R. upon A., so that all married women are in exactly the same position as each other and as spinsters and widows.

Resultant Tones, secondary sounds produced by certain intervals of two notes struck at the same time, in the nature of inverted harmonics, since they sound (all but inaudibly) below instead of above the generating notes. There are two kinds of R. T.: Differential, produced by the difference between the two generating notes, and Summational, produced by the sum of these two notes, i.e. in both cases the vibrations of these notes.

Resurrection, rising again of the body and its reunion with the soul. In its widest sense the belief in the R. is not peculiar to Christianity, and anticipations of it are found in Zoroastrianism and later Judaism. The doctrine of the R. developed after the Babylonian captivity. A few biblical references showing the development are Isa. xxvi. 19; Ezek. xxxvii.; Baruch ii. 17, iii. 11, 19; Wis. iii.; 2 Macc. vii. 9, etc. In apostolic times the belief in the R. was one of the lines of demarcation between the Pharisees and the Sadducees (Matt. xxii. 23 ff., and cf. John xi. 24), and of this controversy St. Paul took advantage when brought before the Sanhedrin. Christian belief in the R. is founded on the rising of Jesus and His subsequent appearances to the disciples. The preaching of the R. seems, indeed, to have formed a large part of the apostolic mission. The fullest N.T. expositions of the belief occur in 1 Cor. xv. and 1 Thess. iv., where the apostle lays stress upon the spiritual nature of the R. of the body. The doctrine was taught generally by the Church fathers, notably Athenagoras (*De resurr. carnis*) and Ephrem (*De resurr. mortuorum*), but Augustine speaks of it as 'vehemently and obstinately opposed.' This was largely due to the widespread conviction among Gk. philosophers, following Plato, that matter was intrinsically evil. It is not claimed that the Christian doctrine of general R. can be proved from reason alone, but that its probability is seen from the fact that man's complete personality involves the life of both soul and body. See *Alger's History of the Doctrine of Future Life*, 1894; W. J. Sparrow Simpson, *The Resurrection and Modern Thought*, 1911; F. E. Marsh, *The Resurrection of Christ*, 1923; H. Wace, *The Story of the Resurrection*, 1923.

Resurrectionists, or **Resurrection-men**, familiar if blasphemous name given to the ruffians who between 1826 and 1830 gained a livelihood by opening graves and selling dead bodies to the teachers of anatomy. Though detection meant punishment and popular fury, some sections of the community favoured their practices, and from the evidence given before the Select Committee of Anatomy, 1828, it is clear the R. regarded themselves as persons pursuing a legitimate calling, and far removed from the stigma of 'thieves.' The sordid case of Burke and Hare (see BURKE, WILLIAM, 1792-1829) showed that the flourishing nature of the trade of the R., coupled with the lack of legislative control of the practice, was a temptation to murder. In 1832 an Act was passed regulating the dissection of bodies and providing for the necessity of obtaining licences. In spite of this Act the practices of the R. continued, though covertly, for some years afterwards.

Resurrection Plant, see ROSE OF SHARON.

Resuscitation, name given to various methods of restoring respiration, and through it the action of the heart. It is required sometimes for the new-born baby, when the action of the lungs needs

starting, no air having entered; a smack or two with the hand or a damp cloth is generally sufficient, but in any case the mouth should be cleared, and the tongue may be brought forward. In obstinate cases respiration may be started by breathing into the lungs with great gentleness, the abdomen being pressed slightly over the stomach to prevent the air entering the oesophagus, and after commencement of respiration it may be aided by rhythmic compression of the abdomen, the infant lying between the palms of the hands; alternate reversal, with decision, of position from prone to supine may help further. Respiration may be interfered with in fainting, in unconsciousness resulting from accident or shock, in fits, in choking, in asphyxiation produced by inhalation of gases, or by 'drowning,' in some cases of poisoning, as by narcotic drugs such as opium or alcohol, or anaesthetics such as chloroform. In all cases there is an accompanying lessening of the heart action, which may be the cause or effect of the lessened respiration; if the cause, the vasometer nerves may be affected by poisoning, or by injury or shock to the brain or upper spinal cord, and the fact must be judged from the nature of the accident; if the effect, it may be judged by the forcible attempt on the part of the heart to restore the normal condition. The distinction is of importance, as the methods of R. must be much more cautious in the former than in the latter, when they may be fairly vigorous. But in every case certain preliminaries are essential: the patient should be laid in a recumbent position, the chin raised from the chest, and all hindrances to full respiration removed or lessened, e.g. collar, tie, corset, waistcoat, etc.; he should be placed in such a position that plenty of fresh air is available; windows should be opened, or onlookers kept at a distance. In an ordinary case of fainting this will be enough, but it is useful to bend the head forward and downward to the knees, following by application of cold water or eau-de-Cologne to the face, the administration of smelling-salts, and a drink of water, sal volatile, or brandy. In most cases of poisoning other remedies come first (see POISON), and mere walking is best, but artificial respiration may be resorted to as a last resort. The administration of oxygen is one form of this, and succeeds in cases where vigorous methods cannot be applied, e.g. following surgical operations. For cases of *apparent drowning* see DROWNING. Any of the methods is useful in some cases of collapse due to electric shock. They are also applied in cases of poisoning by gas. These cases, however, are better treated by combining the artificial respiration with an aspirator fixed to the mouth and supplying oxygenated air, particularly in the case of poisoning by carbon monoxide, which is more readily absorbed by hæmoglobin. See also under AEROTHERAPEUTICS; ARTIFICIAL RESPIRATION; DROWNING. See the Life-Saving Society, *Handbook of Instruction*, and St. John's Ambulance Association, *First Aid to the Injured*.

Retail Prices, Interim Index of, see under STANDARD OF LIVING.

Retainer. The object of a R. is to secure the services of a particular barrister and to bind him not to appear on behalf of the opponent of the litigant who proffers the R. The whole practice or 'etiquette' as to Rs. is settled by the Bar Committee in conjunction with the Incorporated Law Society (q.v.), and the courts have no jurisdiction to decide questions relative to Rs. A *general R.* is the fee paid for retaining counsel before an action has commenced; a *special R.* is one given after commencement and is usually lower than a *general R.*

Retention. Scots equivalent for the right of lien (q.v.). A *special R.* of a thing may be exercised for repairs to it: by a carrier for the expensers of carriage, by a salvor for salvage charges, by an unpaid vendor for the price, or in any similar case. The right of *general R.* in respect of any debt which may happen to be due or against the discharge of a general balance of account arising out of a course of employment is given either by trade custom, express contract, or tacit acceptance of advertised conditions. Law agents, factors, bankers, and policy-brokers, among others, enjoy the right of general R.

Retford, East, municipal bor. and mrkt. tn. of Nottinghamshire, England, on the Idle, 20 m. N.N.W. of Newark; it has corn- and paper-mills, dyeworks, iron foundries, engineering, and indiarubber works. The tn. has also a large agric. trade. E. R. became a bor. in the Middle Ages, and was famous for its markets and fairs. The grammar school was founded in 1552. Pop. 16,100.

Rethel, Alfred (1816-59), Ger. painter, b. at Diepenbend, near Aachen. He began his training at Düsseldorf under Schadow, and achieved fame with his striking, simple frescoes of episodes in the life of Charlemagne for the Aachen City Hall (1844-52). Among his other works are 'Nemesis' (1837), six water-colours depicting the 'Expedition of Hannibal Crossing the Alps' (1844-45), and the illustrations to Reinick's poetical text *The Dance of Death* (1848). See lives by Müller von Königswinter, 1861, and H. Franck, 1937.

Rethel, tn. in the dept. of Ardennes, France, 24 m. N.E. of Rheims; it manufs. fine merino cloth. It was important in the Middle Ages, when it had a famous priory, and was the cap. of a co. Pop. 5400.

Rethrahythe, see ROTHERHYTHE.

Reticle. The time of transit of a star, that is, the time when it crosses the meridian, is determined from the instant the star crosses the middle line of a series of fibres stretched across the field of view in the telescope. The middle line is on the meridian, but for high accuracy the time when the star crosses each of the five or seven lines of the arrangement is taken, and the average is used for the time when the star crossed the middle fibre of the R., as the apparatus is called.

Retief, Piet, see under SOUTH AFRICA, History.

Retina, see EYE.

Retinoscopy, see VISION, DEFECTS OF, Sight-testing.

Retired Pay, see PENSIONS (NAVAL, MILITARY, AND AIR FORCE RETIRED PAY AND PENSIONS).

Retorsion. In international law, R. is the return in kind of acts which fall short of hostility but are marked by unfriendliness. Thus differentiation of tariff may be met by acts of R. on the part of the state injuriously affected. The so-called 'cold war' with Russia after the termination of the Second World War offers many instances of acts of R. See under EUROPE (HISTORY), *The 'Cold War' between the Western Powers and Russia.*

Retort, in chem., vessel in whose chamber an object is subjected to distillation (q.v.) or decomposition by heat, a neck conducting off the volatile products. The R. of the laboratory is made of glass, porcelain, or platinum, is flask-shaped, and has a long neck attached in which the products of distillation are condensed and from which they pass into the receiver. The R. of the gas-works is a cylinder made of iron or clay.

Retreat, military operation, either forced or strategical, by which troops retire before an enemy. It differs from a flight in being orderly and under control.

Retriever, valuable all-round sporting dog. Of the three varieties the Labrador (see also under LABRADOR RETRIEVER), which had a common origin with the Newfoundland dog, is the oldest, though not recognised by the Kennel Club till 1903; since, it has competed with great success at field trials. From it and the setter and the collie, the flat- or wavy-coated R. was

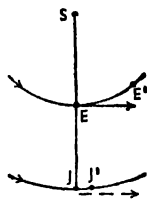


T. Fall
FLAT-COATED RETRIEVER

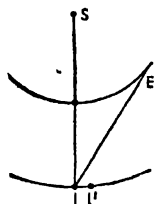
derived. This is a beautiful dog with wonderful 'nose' and great fondness for retrieving. The head is long and fine, the muzzle square, eyes dark, neck long, ears small and carried close to the head, body short and square, stern short and straight, and coat dense black or liver. The golden R. probably derives from the flat-coated R., but is a rich golden colour. The curly-coated R. is traceable to poodle cross-breeding, from which it derives its excellence as a water dog. The coat should have a tight close-fitting curl, and the colour is usually dull black, though

sometimes liver. There are also interbred and cross-bred varieties. The R. should have a 'tender mouth' and should be able to handle game without mangling it. The R. is a strong, well-made sporting dog of unusual intelligence, obedient, easily trained, affectionate, good-tempered, and hardy.

Retrograde Motion. The planets share with the stars an apparent motion westward, due to the rotation of the earth on its axis, but in addition each planet has its own orbital movement round the sun



RETROGRADE MOTION
OF A PLANET



DIRECT MOTION OF
A PLANET

from W. to E. For this reason the planets change their positions amongst the stars, appearing further eastward night by night, but not always. At times a planet appears to remain for a few nights almost in the same position with reference to the stars and then seems to move westwards—a phenomenon which proved puzzling to the anc. astronomers. The explanation of this is very simple, and will be easily understood by referring to the diagram (left) which represents the planet Jupiter moving in its orbit round the sun and also the earth moving in its orbit. If *E* and *J* represent the positions of the earth and Jupiter when the latter is in opposition, that is, in a line with the sun and the earth, then when the earth has moved to *E'* Jupiter will have moved to *J'*, the orbital motion of the earth being much faster than that of Jupiter, so that the arc *EE'* is larger than *JJ'*. An observer on the earth judges the motion of Jupiter by projecting the planet on the background of stars, and when the earth is at *E* Jupiter will be seen in the direction *EJ*. When the earth is at *E'* Jupiter will appear projected on the background of the distant stars in the direction *E'J'*, and an observer on the earth will describe its motion as retrograde, that is, in a direction opposite to that of the earth and the planets in general. In the diagram (right) *E* and *J* represent positions of the earth and Jupiter, respectively, at some other time. The earth is now moving straight away from Jupiter for a short period, and Jupiter itself will have moved in the time to *J'*, so that an observer on the earth will see its motion as direct, because the line *EJ* rotated round *E* to *J'* is in the sense of 'direct' in the solar system. It is easy to make a number of diagrams to show when the apparent motion will be direct and when retrograde. The case of

a superior planet only has been considered, but the explanation is similar for an inferior planet such as Venus or Mercury.

Returning Officer, see under ELECTIONS.

Retz, Rais, or Raiz, Gilles de Laval, Seigneur de (c. 1396–1440), Fr. baron and soldier. He became marshal of France and was famous for his great bravery in war but notorious for his diabolical cruelties, for which he was burnt alive at Nantes (1440). He is said to have murdered nearly 200 women and children. He is supposed to be the original 'Bluebeard.' See Abbé Bossard, *Gilles de Rais dit Barbe-Bleue*, 1886, and F. Winwar, *The Saint and the Devil*, 1948.

Reublin, Wilhelm (c. 1480–1559), Ger. Anabaptist, b. at Rothenburg am Neckar. He was the missionary of Anabaptism to the Swiss, and in 1531 founded a community run on Communist principles. See E. Egli, *Die Zürcher Wiedertäufer*, 1878, and L. Müller, *Der Kommunismus der mährischen Wiedertäufer*, 1927.

Reuchlin, Johannes (1455–1522), Ger. humanist, b. at Pforzheim, Baden, a cousin of Melancthon (q.v.). He was appointed travelling companion to Frederick, son of the margrave, and accompanied him to the univ. of Paris. Here he studied Gk. and applied himself to Lat. composition and Heb. In 1474 he went to Basle, where he took his degree and began to lecture on the classics. In 1478 he returned to France and studied law at Orleans, later teaching this subject at Tübingen. In 1496 he went to Heidelberg, where he trans. many Gk. works, and about 1500 he was made a judge of the Swabian League at Stuttgart. He came into conflict with Pfefferkorn, a Jewish renegade, in 1510 for defending Jewish books other than the Bible, Pfefferkorn having urged the emperor to have all, with the exception of the O.T., burnt. R. maintained that only those of a definite anti-Christian character should be condemned. R. pub. *Breriquis, id est Dictionarium singulas voces latinas breviter explicans; Epistolæ Obscurorum Virorum*, and treatises on Heb., Gk., etc. See life by L. Geiger, 1871; also J. Haller, *Die Anfänge der Universität Tübingen*, 1927–29.

Reunion, Île de la, formerly known as **Île de Bourbon,** is. of the Mascarene group, Indian Ocean, forming, till 1946, a Fr. colony. It is 420 m. E. of Madagascar. It is of volcanic origin, and is divided into two portions, E. and W., by a chain of mts. and a tableland. The highest point, Piton des Neiges, reaches an altitude of 10,070 ft., and is surrounded by extinct craters. The climate is temperate, but hot on the coast. R. is well watered by numerous streams, most of them navigable, and the soil is fertile. Hot mineral springs exist on the slopes, and sanatoria have been estab. at Salazie and Hellbourg. The chief products are sugar, rum, manioc, vanilla, tapioca, starch, etc. In 1946 112,990 tons of sugar and 2890 tons of rum were exported. St Denis is the cap. (pop. 36,000), and St. Louis, St. Pierre, St. Benoit, and

St. Paul are other prin. tns. Point-des-Galets on the N.W. coast is the chief port; a coastal railway connects it with St. Benoît and St. Pierre. R. was discovered by Pedro de Mascarenhas in 1513. France annexed it in 1638. England held it from 1810 to 1815, and on its restoration to France it was renamed R. In 1946 the status of R. was changed to that of a dept. of France. It is administered by a governor assisted by a privy council, and an elected council-general. It is represented in the National Assembly by three deputies, in the Council of the Republic by two senators, and in the Assembly of the Fr. Union by one delegate. It was controlled by Vichy in the early part of the Second World War; but Fighting Fr. troops landed on Nov. 29, 1942. Area 970 sq. m. Pop. 221,000 (Fr. 211,400).

Reus, city in the prov. and 5 m. N.W. of the tn. of Tarragona, Catalonia, Spain; it is an important commercial centre and has cotton spinning, manufs. of silk, soap, and leather. Flour, brandy, and fruit are exported. Pop. 36,000.

Reuss, riv. of Switzerland, trib. of the Aar. It rises in the canton of Uri and flows in a general northerly direction over a course of about 30 m. into Lake Lucerne. Issuing from the lake, it flows N.W. and joins the Aar. Length, including Lake Lucerne, 100 m.

Reuss, name of two former Ger. principalities, both founded in 1647; the elder covered an area of 122 sq. m. Cap., Greiz. The younger principality covered an area of 319 sq. m. Cap., Gera, on the Elster. After the First World War the two principalities became republics, and in 1919 became part of the republic of Thuringia. The ter. is for the most part mountainous or hilly, and the surface is largely covered with forest. The chief industries are grazing, printing, and the manuf. of woollens, soap, porcelain, paper, etc. The inhab. are nearly all Evangelical Protestants. Pop. about 230,000.

Reuter, Christian (c. 1665-1712), Ger. satirist, b. probably at Kuttun bei Halle. His satires on the *haute-bourgeoisie* of the late seventeenth century have something of the wit and penetration of Molière. They include *L'Honnête Femme oder die ehrliche Frau zu Plissine* (1695) and *La Maladie et Mort de l'honnête femme, das ist: Der ehrlichen Frau Schlammpanne, Krankheit und Tod* (1696). See lives by E. Gehnlich, 1891; O. Doneke, 1929; and F. G. Schneider, 1936.

Reuter, Heinrich Ludwig Christian, known as Fritz (1810-74), Ger. dialect poet and story-writer, b. at Stavenhagen, Mecklenburg-Schwerin, and studied law at the univ. of Rostock and Jena. At Jena he took part in a students' political club, with the result that he spent five years in prison for treason. Later he took up farming and then private teaching. In 1843 he pub. *Läuschen un Riemels*, a collection of humorous poems which became extremely popular. Next appeared *De Reis' na Bellingen*; *Kein Husung*; *Hanne Nüte un de lütte Pudel*; *Schurrr-Murri*; *Dörchläuchling*; *Urgeschicht von Mecklenborg*; *Olle Kamellen*, his prin.

prose work; *Ut mine Stromtid*, his masterpiece; *Lustspiele und Pöllerabendgedichte*, etc. R's stories (written in 'plattdeutsch' or peasants' dialect) are marked by fresh humour and skilful character-drawing, though the plots are somewhat weak. See lives by A. Römer, 1895; A. Wilbrandt, 1902; and K. Gaedetz, 1906.

Reuter, Paul Julius de, Baron (1818-99), Ger. telegraph promoter and the founder of Reuter's Agency, b. at Kassol and became a bank clerk at Gottingen. He formed an organisation at Aachen in 1849 for transmitting commercial news by pigeon post and then by telegraph, and in 1851 came to England and opened an office in London for the transmission of intelligence between England and the Continent. His enterprise rapidly grew in importance, and is now in operation over all parts of the world. His business was converted into a limited liability company in 1865, and in 1871 he was created a baron.

Reuters, leading Brit. and international news agency, founded by Baron Julius Reuter (q.v.). R. have a world-wide service covering all kinds of foreign news. After the First World War the business was converted from a public company into a private trusteeship, the shareholders being paid out for over £500,000. Later the concern became closely associated with the Press Association, which agency previously had transmitted Reuter messages to the newspapers of Great Britain. This arrangement thus involved the proprietorship of the famous agency passing to the newspapers of Great Britain, a policy dictated by national considerations. In 1947 the final steps were taken to convert R. into a world news agency under the ownership and control of the newspapers of the United Kingdom, Australia, and New Zealand. New articles of association were adopted by the Press Association's and the Newspaper Proprietors' Association's representatives, and the Australian Associated Press and the New Zealand Press Association have taken up new shares in R., while both these dominion agencies have become parties to the Reuter Trust. In 1949 the Press Trust of India took shares in the Reuter Trust. The independent chairman of the Reuter Trust is appointed by the lord chief justice. The trust deeds stipulated that R. shall never pass under the control of one interest or group. See also under PRESS ASSOCIATION.

Reutlingen, tn. of Württemberg, Germany, on the Eschach, 19 m. S. of Stuttgart. There are manufs. of cotton and woollen goods, leather, and paper. The church of St. Mary, built in the thirteenth century, is extremely fine. Pop. 38,800.

Revel, tn. of Haute-Garonne, France, 31 m. E.S.E. of Toulouse. Pop. 5200.

Revel, or **Reval**, see TALLINN.

Revelation, in theology denotes the unveiling of some truth by God to man. The term is used in a more restricted sense for the manifestation of truths, given through the sacred Scriptures. If the existence of a personal God be once granted the possibility of R. cannot be

denied, though the fact and the nature of R. remain to be investigated. For the Modernist School (Loisy, Tyrrell) the so-called truths of R. were but the expressions of the highest desires of man in his efforts to attain to a transcendent God, and so these so-called dogmas were liable to change and reinterpretation. The traditional doctrine supposes a 'deposit of faith,' i.e. a number of truths revealed or manifested by God to man of permanent value for all time. For a truth to be revealed it is not required that it should be otherwise unattainable, but that it should in point of fact have been revealed. Thus the existence of God may be demonstrated from reason, but it appears in the Bible without such demonstration (Exod. iii. 14). Frequently, however, revealed truths are distinguished from natural religion, the content of which is demonstrable by the processes of reason.

Revelation, Book of, otherwise known by its Gk. title *Apocalypse*, the last book of the Bible. It belongs to a class of literature which is treated generally under the heading *Apocalypse*. Its ascription to St. John the Apostle depends rather on the early tradition mentioned by Justin Martyr (A.D. 140), than on the MS. authority. By some it has been attributed, after Eusebius, to John the Presbyter, but the separate existence of this person has never been proved. We have the statement of Irenaeus for the vision having been seen not long since, 'almost in our own generation, at the close of the reign of Domitian' (A.D. 98), and he attributes it expressly to 'John the disciple of the Lord' (*Adv. Haer. V., xxvi.*). The difference of style between the Fourth Gospel and the *Apocalypse*, however, constitutes a difficulty. The meaning of the book has been a constant subject of dispute. It has repeatedly served as a foundation for Chilian views. The first part (chapters i.-iii.) consists of letters of encouragement or warning to the bishops, called 'angels,' of the Asiatic churches. The body of the prophecy (chapters iv.-xxii.) undoubtedly deals with the end of the world, though there are allusions to contemporary events and to the Christian liturgy of the first century. In reading the visions it is important to realise that they are not arranged in chronological order, but are like a series of separate flashes each describing the end of the world under a separate set of symbols. See H. B. Swete, *The Apocalypse* (3rd ed.), 1911; J. Chapman, *John the Presbyter*, 1911; and R. H. Charles, *The Apocalypse*, 1920; also the very detailed work of Allo, *St. Jean: L'Apocalypse*, 1921.

Revels, Master of the, name of an Eng. official formerly attached to royal and noble families. He was also known as the 'Lord of Misrule,' and his chief function was to preside over plays and performances of mountebanks, ballad singers, etc., and generally supervise and arrange the amusements of the court or great house as the case might be. The office fell into disuse early in the eighteenth century.

Revelstoke, tn. in Brit. Columbia, Canada, on the Canadian Pacific Railway, 360 m. N.E. of Vancouver. It is the centre of a mining and lumber dist. Pop. 3200.

Reventlow, Count Christian Ditlev (1748-1827), Dan. statesman and reformer, b. in Copenhagen. He was an able administrator, and while in office entirely reorganised Dan. agric. economy. In 1786 he initiated the appointment of the commission which abolished serfdom.

Reventlow, Count Ernst Christian Einar Ludwig Ditlev (1869-1943), Ger. politician, b. in Husum, Schleswig-Holstein, at that time a part of Prussia. He was a writer on political subjects and on naval strategy, and in the decade before the First World War was a leading member of the 'Pan-Ger.' group of politicians. He became a member of the Reichstag in 1924 and joined the National Socialist party three years later.

Revenue, Public, see PUBLIC REVENUE.
Reverberatory Furnace, see under FURNACES.

Revere, Paul (1735-1818), Amer. patriot, b. in Boston, Massachusetts. He served as a soldier, became a gold- and silver-smith in Boston, where he printed the paper money ordered by Congress in 1775 and estab. a powder-mill, took part in the 'Boston Tea Party' (1773), and became a member of the Boston 'Anti-Brit. Society.' His midnight ride to Lexington and Concord (April 1775) to warn the people of the approach of the Brit. troops was rendered famous by Longfellow's poem, *The Midnight Ride of Paul Revere*. In 1801 he founded the R. Copper Company at Canton, Massachusetts. See lives by C. F. Gettemy, 1903, and H. O'Brien, 1929.

Revere, tn. and holiday resort of Suffolk co., Massachusetts, U.S.A., 5 m. N.N.E. of Boston. Pop. 34,400.

Reverend, title of respect generally accorded to all clergy and ministers of religion, though it has on some occasions been repudiated by certain dissenting ministers. In the Anglican Church deans are spoken of as 'Very Reverend,' bishops as 'Right Reverend,' archbishops as 'Most Reverend.' In Scotland the title 'Right Reverend' is applied to the Moderator of the General Assembly. In Rom. Catholic countries priests are addressed 'Reverend Father' and mother superiors 'Reverend Mother.' R. is not a substitute for Mr. in either writing or speech.

Reversed Trades, see under TRADE WINDS.

Reversing Layer, in astronomy, stratum of the sun's atmosphere whose absorption of the light from the photosphere produces some of the dark lines of the spectrum. The layer, which was discovered by Young in 1870, is at a lower temp. than the photosphere upon which it lies, but is itself incandescent. The white light of the photosphere passes through the stratum, with the result that light of those qualities characteristic of the stratum itself is absorbed, so that dark lines are produced in the spectrum. If, however, the photosphere is itself

eclipsed, the spectrum of the layer shows reversed or bright lines.

Reversion, in law, returning of an estate to the grantor or his heirs, after a particular estate is ended; e.g. if A gives a life estate to B out of his fee simple estate of Blackacre, the R. will be in A's heirs, and similarly the R. of the fee simple will be in the grantor and his heirs of a fee tail by mere implication of law and without any express reservation (see ESTATE, FEE). The interest of a landlord after the expiration of a lease is also called the R. In Scots law, R. as applied to heritage is a right of redemption, and is either legal, i.e. that which the law provides of its own motion, or conventional, i.e. that of a wadset or heritable bond entitling the debtor to 'disencumber' the estate.

Reversion, in heredity, name given to the biological fact that the species revert in some of their peculiarities to ancestral forms. Children, for example, often revert in certain particulars, both physical and moral, to their grandparents, or even more remote ancestry; again, Darwin considered that the slaty-blue pigeons which occasionally appear in all breeds are an instance of R., and that the inference of such fact may be drawn from the number of the markings correlated with the blue tint, because of the improbability that all the markings would appear together from a simple variation (see DARWINISM). The appearance of a certain characteristic in an organism may depend upon the presence of sev. different genes (see MENDELISM) in the fertilised egg from which the organism developed. In succeeding generations these genes may become separated, and their subsequent accidental recombination will cause the reappearance, or R., of the characteristic. In contrast to the views of Darwin the tendency at the present time is to regard the occasional appearance of a tail, or supernumerary nipples, in humans as being mere accidents of development, rather than as examples of R. to the ancestral condition. Similarly the simple brain and low mental capacity of a microcephalous idiot are more probably caused by a defect in development than by a R. to an ape-like ancestor. In medicine the term R. is used to denote the recurrence of a disease which has not revealed itself during intermediate generations. See also ATAVISM; HEREDITY.

Reversion Duty, see LAND TAXES.

'Review of Reviews,' former review of the monthly literature of all contemporary periodicals, together with a general commentary on the leading topics of the day. It was founded in 1890 by W. T. Stead (q.v.), whose characteristic political views dominated the R. of R. up to the time of his death. A notable feature of the R. of R. was the reproduction of the most striking Eng. and Amer. political cartoons of the day. Later it was owned and ed. by H. W. Stead (q.v.). The R. of R. became the *World Review* (q.v.) when Edward Hulton assumed control in 1940.

Revillagigedo Islands, group of uninhabited rocky is. in the Pacific Ocean,

off the W. coast of Mexico, about 19° N. and 111° W., belonging to the Mexican state of Colima. Total area is 320 sq. m., including the is. of Socorro, San Benedicto, Roca Partida, and Clarion.

Revival (of religion), name now used for various religious movements which caused a renewal of zeal and fervour in the cause of religion, e.g. the crusades, the Franciscan movement of the thirteenth century, and the early work of the Jesuits. The term, however, is a modern one, and is perhaps best used only in its modern connection. In this case its. are a feature of Protestant church life by which, under the influence of vigorous and fervid preaching, conversion of heart is felt by the unconverted and additional zeal is stimulated in church members. The 'Great Awakening' was the great R. of America, and is specially connected with the name of Jonathan Edwards. In England the names of Wesley, Whitefield, Moody and Sankey, Evan Roberts, Torrey and Alexander are well known in connection with religious R.s.

Revival of Learning, see RENAISSANCE.

Revocation. In the law of contract an offer may be revoked at any time before acceptance, for it is acceptance that binds the parties contractually. An offer is accepted when the acceptance is communicated: this means more than a tacit formation of intention; there must be some overt act or speech to give evidence of that intention; but in any case acceptance is 'communicated' when it is made in a manner prescribed or indicated by the offeror and therefore acceptance may be held to be communicated and the contract made though the acceptance has not come within the knowledge of the offeror. But an exception to this general rule as to the revocability of an offer must be made in the case of offers under seal. Such an offer cannot be revoked: even though it is not communicated to the offeree it remains open for his acceptance when he becomes aware of its existence. A R. (as distinct from lapse for want of acceptance) is inoperative until communicated, and the withdrawal of an offer is not 'communicated' by the mere posting of a letter. Consequently an acceptance made by post is not affected by the fact that a letter of R. is on its way. The above is the general rule, though there have been precedents which suggest a modification when the offer is one to sell property and the R. takes the form of a sale of the property to a third person. In business there must be many offers which do not contemplate an immediate acceptance; a reasonable time is here allowed during which the offer is continuing, and a mental R. would not avail against an acceptance made within such time.

In the law of principal and agent, the relation of principal and agent is founded on mutual consent, and therefore may be terminated by the same process which originated it, the agreement of the parties. Where the authority of an agent is determined by R., such R. is a 'condition subsequent' of the contract of agency;

i.e. it is a term in the original contract of employment. The principal's right, however, to revoke is affected by the interests of (1) third parties; (2) the agent. (1) A principal may not privately limit or revoke an authority which he has allowed his agent publicly to assume. He will be bound by the acts of the agent which he has given other persons reason to suppose are done by his authority. (2) If the employment is in its nature such that the authority cannot be revoked without loss to the agent, the principal may not revoke. This rule may be regarded as identical with a rule of a more limited significance, that an authority coupled with an interest is irrevocable. Authorities given to an agent to pay to a third party a debt which he owes to his principal, or to sell lands and pay himself a debt due to him out of the proceeds, are instances in which an authority has been held to be irrevocable by reason of interest. For it. of will see WILLS, and for R. of patents see PATENTS, *Revocation*. See Bowstead's *Digest of the Law of Agency*, 1944, and Anson's *Contracts*, 1945.

Revolution, name given to a change in the internal constitution and government of a country, when brought about by the concerted and more or less violent action of the inhab. Among the more important Rs. in the world's hist. are the R. in England in 1688, when William of Orange came to rule over England; the Amer. R. of 1776, when England was obliged to give America her independence; the Fr. R. of 1789; and the Russian R. of 1917. The change of Britain from an agric. into an industrial country is known as the Industrial R. (q.v.). For details of Rs. see hist. section of FRANCE, U.S.A., etc.

Revolvers and Revolver Shooting. Pistols have been superseded by R., except occasionally for target practice. A revolver is a single-barrelled pistol having a revolving breech, which contains sev. chambers for cartridges. The breech was originally revolved by hand, but in 1835 the first practical revolver was produced by S. Colt, an Amer. In the Eng. revolver the pull of the trigger, in the Amer. type the cocking of the hammer, revolved the cylinder; the first double-action revolver, in which either of these principles could be employed was produced in 1855. Rim-fire, pin-fire, and central-fire cartridges were successfully invented, the last being in general use save for small-calibre R. The revolver is designed for quick use at close quarters and is mainly a weapon of defence. Although capable of being used with precision, it is normally used instinctively, on the spur of the moment, as when taking a shot at game with a shot-gun. Modern R. are so constructed that when the arm is extended naturally to take a shot, the barrel of the revolver is pointing at the 'target,' so that even in moments of excitement shots will be effective. Both Colt and Adams R. were used in the Crimean war and later were adopted by the navy. The U.S.A. is regarded as the home of the revolver, and during the civil war whole corps were armed with four R. each man. The

action of reloading being comparatively slow, they were no match against corps armed with repeating carbines. There are sev. makes of modern R., and in the Brit. Army the Webley is used. Other makes are the Smith & Wesson, Webley-Wilkinson, Webley-Scott, and Colt. Revolver-shooting competitions are held under the auspices of the National Rifle Association at Bisley: Revolver Gold Badge, open to all comers; revolver medals, all comers ten to fifty yards range shoots; and revolver prizes, all comers, divided into four series. See also FIRE-ARMS; PISTOL.

'Revue des Deux Mondes,' Fr. review, most outstanding of all the bi-monthly periodicals which appeared until the Second World War. It was founded in 1829 by Ségur-Dupeyron and Mounroy, and later taken over by Buloz, under whose direction (which continued for over forty years) it acquired an enormous vogue. Apparently it owed its revived fortunes to the vicissitudes of the revolution of 1848, when it took up a constitutional and monarchist attitude, and thereby gained both the favour and patronage of the wealthy. In its origin the *R. des D. M.* was purely literary, but afterwards opened its columns to scientific discussion, political hist., and current politics. Balzac wrote in the *R. des D. M.* for a time, and so did Gustave Planche, who incurred the hostility of Victor Hugo by his criticisms of the latter's masterpieces. Between the two world wars the jour. was moderately Conservative and Nationalist in attitude.

Rewa, or Rewah: 1. State of Vindhya Pradesh, India. It has coal and iron mines, and produces rice and grain. Area 13,000 sq. m. Pop. 1,820,200. 2. Tn., cap. of the above, 75 m. S.W. of Allahabad. Pop. 30,000.

Rewa Kantha, former agency, consisting of sixty native states, in the Gujerat div. of Bombay. After the transfer of power in 1947 they were absorbed into Bombay Prov., India.

Reward, return for some voluntary act, but the corrupt taking or advertising Rs. may bring the offender within the criminal law. Advertising a R. for the return of stolen or lost articles is lawful, but to add words to the effect that no questions will be asked or inquiries made renders the person so advertising liable to a penalty of £50. No action for this offence can be brought against the printer or publisher of a newspaper containing such an advertisement, except with the leave of the attorney- or solicitor-general, and not at all after the expiration of six months from the pub. A person may be punished as for larceny who *corruptly* takes a R., i.e. takes the R. under pretence of helping to recover stolen property, but does not 'use all due diligence to cause the thief to be brought to trial.' Apparently keeping property back, like a cheque, the ownership of which is clear, in the expectation of the offer of a R., is not criminally punishable, but would certainly render the person doing so liable to damages for detention.

Rewari, tn. of E. Punjab, India, 43 m.

S.W. of Delhi; there is trade in grain, sugar, iron, and salt. Pop. 30,000.

Reykjavik, or **Reikjavik**, tn. and cap. of Iceland, on the S.W. coast at the head of the Faxa Fjord. It is of Viking foundation, estab. by Ingolf in 874 (see under **ICELAND, History**), but the present tn. is largely modern. It has a cathedral, a univ. (inaugurated in 1911), and theological and medical schools, the 'Althing,' or Parliament house, with a library and museum of Icelandic antiquities attached, and governor's house. In 1945 the heating of R. by piped water from the hot springs and geysers was completed. The exports consist of skins, butter, and fish

thrown by the Pétain regime and made the scapegoat for France's unreadiness for war, though he can hardly be blamed fairly for being unable in two months as Premier to remedy defects in defence which were the result of many years of ill conceived policy. He fought against the capitulation at Bordeaux to the last, and later suffered for his personal resistance by being first imprisoned by Pétain and later deported to Germany, where he endured a period of solitary confinement. In Aug. 1948 he took office for the first time since 1940 as minister of finance under André Marie, and proposed far-reaching fiscal reforms involving

R.A.



REYKJAVIK THE HARBOUR

L N 1

R was the headquarters of the allied occupation force during the Second World War. Pop. 48,900.

Reynard the Fox, see under **FABLE**

Reynaud, Paul (b. 1878), Fr. statesman, b. at Barcelonnette, Basses-Alpes. He became a successful advocate at the Paris Bar, and entered politics in 1919, joining Flandin's right-wing Democratic Alliance. He was fifty-two before he held his first ministerial office, and was minister of colonies, justice, and finance in various Flandin and Tardieu govs. after 1930 and minister of finance under Daladier (q.v.) from 1938 to 1940. He improved the nation's financial situation by decrees increasing taxation and by economies in public works expenditure. He was critical of the appeasement policy, and, after the Munich Pact (q.v.), broke away from Flandin's pro-appeasement party and remained an independent thereafter. He won a considerable reputation by his speeches calling for a vigorous conduct of the war, becoming Prime Minister, March 23, 1940, in succession to Daladier, who had signed the Munich Pact. On the collapse of France, however, he was over-

thrown by the Pétain regime and made the scapegoat for France's unreadiness for war, though he can hardly be blamed fairly for being unable in two months as Premier to remedy defects in defence which were the result of many years of ill conceived policy. He fought against the capitulation at Bordeaux to the last, and later suffered for his personal resistance by being first imprisoned by Pétain and later deported to Germany, where he endured a period of solitary confinement. In Aug. 1948 he took office for the first time since 1940 as minister of finance under André Marie, and proposed far-reaching fiscal reforms involving

Reynolds, Sir Joshua (1723-92), Eng. portrait painter, b. at Plympton, Devon. His father was headmaster of the local grammar school. While very young he showed great artistic talent, and in 1740 his family sent him to study under Hudson, a leading contemporary portrait painter. He returned to Devon, where he painted over twenty portraits, and later visited Italy and the Mediterranean, where he studied the It. old masters and became a lifelong admirer of Raphael, from whom he derived much of his skill in design and treatment of skins and materials. R. then settled in London. He lived in Great Newport Street until 1760, and then took a house in Leicester Fields. He was soon acknowledged as the finest portrait painter in England; he executed portraits of persons so diverse as George III, Laurence Sterne, Dr. Johnson, Garrick, Lady Sarah Bunbury, and Kitty Fisher.

In 1768 R. was appointed president of the Royal Academy, and was knighted in the following year. For the remainder of his life he exhibited many of his most famous paintings in the Royal Academy's gallery. R.'s encouragement of new talent was constant and generous; he founded the Royal Academy Schools, giving his first lecture to students there in 1769. He also suggested the foundation of the Royal Academy banquet, and the appointment, as honorary profs. of the Academy, of leading figures of the day. Of his many works, the *Discourses* (pub. in Everyman's Library) contain advice which is still valuable to students of painting. R.'s literary interests were wide. He was the founder of the Literary Club.

R. painted many historical scenes, but he is remembered chiefly for his portraits. His draughtsmanship was superb, and he possessed a wonderful sense of colour. He followed da Vinci in never ceasing to experiment for new colour combinations and effects, and, like da Vinci, his efforts have resulted in some of his pictures becoming faded, though in others the rich tones remain to justify his inventiveness. R. also possessed, though to a lesser degree, Rembrandt's gift of chiaroscuro, and, in the Eng. portraiture tradition, he is the successor of Van Dyck in his graceful studies of the Eng. aristocracy, though in detail of style he is not so close to Van Dyck as Gainsborough.

R. exercised great influence, not only on Eng. portraiture, but in every field of Eng. art. There are paintings by R. in many Eng. galleries, including the Royal Academy, the National Portrait Gallery, the National Gallery, and in many private collections in Britain and N. America.

See ed. of R.'s work with life by E. Malone, 1798. See also lives by J. Northcote, 1819; Sir C. Phillips, 1894; Sir W. Armstrong, 1900; M. Osborn, 1908; F. Rutter, 1923; A. Dayot, 1931; and J. Steegman, 1933.

'Reynolds News,' Brit. Sunday newspaper, founded May 5, 1850, by George Wm. McArthur Reynolds, eminent Chartist politician and prolific Victorian novelist, who ed. the paper from 1850 until his death in 1879. Estab. to 'defend the rights of the masses' R. N. was a powerful champion of trade unionism, and was particularly noted for its support of the successful dockers' strike of 1889. For a period in the early part of this century the paper came under the Liberal ownership of Lord Dalziel. The paper was purchased by the Co-operative movement in 1929, and reverted fully to its Socialist background. It is now the only Sunday Labour and Co-operative newspaper.

Rha, see VOLGA.

Rhabanus Magnentius, see RABANUS.

Rhabdomancy, see DIVINATION and DIVINING ROD.

Rhadamanthus, in the mythological stories of the Gks., son of Zeus and Europa. He is said to have been made a judge of the departed souls on account of his own justice.

Rhætia, or Rætia, prov. of the Rom. Empire, lying in the Alps, S. of the

Danube, now occupied by the canton of Grisons, Switzerland, and part of the Tyrol. It was subdued by Tiberius and Drusus (15 B.C.). Its cap. was Tridentinum (Trent); Augusta Vindelicorum (Augsburg) was in its N. part, Vindelicia.

Rhætian Alps, div. of the Alps, lying to the N. of Lombardy, Italy, and between the R. Adda on the W. and the Inn on the E. The chief heights are the Piz Bernina (13,304 ft.), the Piz Roseg (12,936 ft.), and the Ortler Spitze (12,804 ft.).



SIR JOSHUA REYNOLDS
Engraving after a self-portrait.

Rhætic Beds, uppermost formations of the Triassic system. They are composed of red, green, and grey marls, black shales, sandstones, bone-beds, and exhibit thin coal seams in Germany. They are also known as the *Aricula contorta* beds from one of the characteristic fossils, and also as White Lias; other fossils are *Cardium Rh.*, *Pecten valon.*, *Pullastra arenicola*, *Saurians*, *Microlestes*, etc. In England they extend from Devonshire, through Bristol, to the coast of N. Yorkshire; on the Continent they are found in Germany, France, Italy, and the Rhætian Alps.

Rhæto-Romanee Languages, see under ROMANESCH.

Rhæge, or Rhages, see RHÉ.

Rhamnaeeæ, see BUCKTHORN.

Rhamnus ('Ράμνος; modern *Obrío Kastro*), scapeart of the tribe *Eantis* in N.E. Attica, anct. Greece, 25 m. from Athens, on the road from Marathon to Oropus. It derived its name from a kind of prickly shrub (ραμνος or ραλιος). It was famed for its temple and colossal statue of Nemesis, the 'Rhamnusia virgo' or 'dea' of Ovid and Catullus. In 1891 ruins of a small temple to Dionysus and a theatre were discovered. A statue of Themis was found in another temple near. See W. M. Leake, *Dem of Attica*, 1840, and C. Wordsworth, *Athens and Attica*, 1888. Rhamphastidae, see TOUCANS.

Rhapsinitus, classical form of the Egyptian Rameses, probably to be identified with Rameses III., king of Egypt (twelfth century B.C.). Herodotus (II. 121) tells the story of the theft by two brothers of the treasure stored in the king's treasury (at Medinet Abu in Thebes). Most collections of European folk-tales contain similar stories of *The Master Thief*. Some consider the tale to be of Egyptian origin. See Köhler, *Orient und Occident*, 1864; W. A. Clouston, *Popular Tales and Fictions*, 1887; G. Maspero, *Contes populaires de l'Égypte ancienne*, 1889; *Gesta Romanorum*.

Rhapsodists (Gk. *ῥαψωδός*, bard), originally epic poets of anct. Greece who recited their own verses in public; but by the sixth century B.C. the term was generally used of the professional reciters of other people's poems, especially those who declaimed the poems of Homer at various festivals, without instrumental accompaniment, merely holding a branch of bay in the hand.

Rhapsody, originally a recited or chanted poem, especially an epic one; but the term became adapted to music of a declamatory character and later, by derivation therefrom, to compositions of an eloquent kind cast in no definite form. The temptation thus arose to call any shapeless work, or any work whose form could not be classified, a R., but good compositions of that kind have, like all good works of art, a satisfactory form of their own, though it may not lend itself to classification.

Rhatany, or *Krameria triandra*, half-shrubby leguminous plant found on the dry gravelly soil of Peru. The root is excessively astringent, and is exported to Europe on that account; its powder, mixed with charcoal, forms excellent tooth-powder.

Rhayader, mrlkt. tn. of Radnorshire, Wales, on the Wye, about 40 m. N.W. of Hereford. It is a centre for the sale of sheep and farm produce generally. Some 4 m. away, among the hills, are the great reservoirs which constitute Birmingham's water supply. Pop. 900.

Rhé, île de, see **RÉ, ÎLE DE**.

Rhé, Rai, or **Shah Abdul Azim** (anct. **Rhagès Rhages**), ruins in Persia, 6 m. S. of Teheran. For many centuries the city was the cap. of Persia. The tomb of Shah Abdul Azim in the S.W. is much frequented by pilgrims. It was the bp. of the famous Caliph Harun-al-Rashid (eighth century). It was destroyed by the Mongols in the thirteenth century, and Teheran became the home of its inhab.

Rhea, or South American Ostrich, genus of struthious birds, with three toes to the foot, a feathered head and neck, well-feathered wings, and rudimentary tail. Two species are identified: *R. americana*, which has been slaughtered in enormous numbers in recent years, though attempts have been made with considerable success to domesticate it. The other species is Darwin's R. (*R. darwini*), which is smaller in size, has shorter legs, feathered to a tarsus, and has the plumage mottled or less uniform in colour. It occurs in

Patagonia. See Darwin, *Naturalist's Voyage*.

Rhea ('Péa, 'Pén), in Gk. mythology, daughter of Uranus and Gaea, wife of Cronus (Saturn), and mother of Zeus, Poseidon, Hades, Hera, Demeter, and Hestia (Vesta). Her worship probably originated in Crete. She was regarded as an earth-goddess and type of the fruitfulness of nature. Often called the 'mother of the gods,' she was identified with the Asiatic Cybèle (q.v.) or Cybèle, 'the Great Mother.'

Rhea Fibre, see **BEHMERIA**.

Rhea Sylvia, or **Ilia**, in Rom. legend, daughter of Numitor and mother by Mars of Romulus and Remus. King Amulius had forced her to become a vestal virgin, and after the birth of her sons had her drowned. The poets taught that she was changed into a goddess and became the wife of the Anio.

Rhegium, see **REGGIO DI CALABRIA**.

Rheims, or **Reims**, city of France, in the dept. of Marne, 81 m. E.N.E. of Paris, on the r. b. of the Vesle, a trib. of the Aisne. The chief industries are the manuf. of flannels, cloth, cotton goods, chemical products, candles, soap, stained glass, paper, and machinery. It is famed for its wines, particularly champagne. The most interesting architectural feature of the tn. is the cathedral of Notre Dame, where the kings of France used to be crowned. Founded in 1211, on the site of earlier churches, it has undergone many changes, and its façade is one of the most perfect masterpieces of the Middle Ages. Bombardments during the First World War severely damaged, though did not destroy it. Other beautiful old buildings, including the archiepiscopal palace, tn. hall, and Hôtel Dieu, were, however, destroyed. The cathedral was restored and reconsecrated in 1937, and reopened the following year, although in 1950 replacement of statues damaged thirty years before was still going on. R. was an important tn. during the time of Cæsar. Christianity was introduced in the fourth century, and Clovis, after his victory at Soissons (486), was baptised at R. in 496 by St. Rémy, or Remigius (q.v.). Historical meetings of Pope Stephen III. with Pepin the Short, and of Leo III. with Charlemagne, took place at R. In the tenth century R. became the centre of intellectual culture, and in 1139 Louis VII. granted the tn. a communal charter. The treaty of Troyes ceded it to the Eng., but on the approach of Joan of Arc they were expelled. It was held by the Gers. during the war of 1870-71, and was captured by them in 1914, but soon evacuated, and was under continuous bombardment, 1914-18. It was again occupied by the Gers. in June 1940, and evacuated by them, almost undamaged, in face of the rapid advance of the Allies after crossing the Seine, at the end of Aug. 1944. In May 1945 R. was the headquarters of Gen. Eisenhower (q.v.), where he received the unconditional surrender of the Gers. by Jodl, acting on behalf of the Ger. high command (May 7). Pop. 110,700.

Rhein, or Rhenus, see RHINE.

Rheinberger, Joseph Gabriel (1839-1901), Ger. musical composer, b. at Vaduz, studied at Munich, becoming prof. there (1859). He was considered one of the finest theory and organ teachers of his day, and after succeeding Wüllner as Hofkapellmeister (1877) devoted much time to sacred music. His compositions include organ sonatas, the oratorio *Christophorus*, operas, overtures, cantatas, and chamber music. See life by T. Kroyer, 1916.

Rheine, tn. in Westphalia, Germany, on the Ems, 30 m. N.W. of Osnabrück. Its industries include tobacco preparation, engineering, and cotton-spinning. It was the cap. of a small principality in medieval times, and has some Gothic and baroque buildings. Founded in 838, it became a tn. in 1327. Pop. 35,200.

Rheingau, dist. of Hesse, Germany, on the r. b. of the Rhine; Rüdesheim is at one extremity of this region, which is very fertile, and produces excellent wine. Eltville is the chief tn.

Rheinhausen, tn. of Germany, on the Rhine opposite Duisburg. There are important iron and steel works. Pop. 40,300.

Rhein-Kreis, see RHEIN-PROVINCE.

Rhemes, see under SEMANTICS.

Rhenanus, Beatus (1485-1547), Ger. humanist, b. at Reims. He studied at Paris and then at Basle, where he entered on a lifelong friendship with Erasmus. He wrote *Rerum Germanicarum, libri iii.* (1531), and ed. the works of Erasmus (1540-41), besides those of Pliny, Tacitus, etc.

Rhenish Architecture, see ARCHITECTURE.

Rhenish Prussia, see RHINE PROVINCE.

Rhenish Wine, somewhat antiquated term for all wines which are made in the vineyards bordering on the banks of the Rhine, Moselle, and Main. All the wines so made are white, but a minute quantity of red is made in the dist. around Andernach and Ingelheim, which is poor and not regarded as important even in Germany.

Rhenium, metallic chemical element, symbol Re, atomic number 75, atomic weight 186.3. It was discovered by Noddack and Tacke in 1925, in certain platinum ores. R. is a gray metal, sp. gr. 20, with a very high melting point. It has so far found no industrial application, but potassium perhenate, $KReO_4$, can now be obtained with comparative ease, so that commercial uses may follow. Chemically R. is an analogue of manganese.

Rhenus, see RHINE.

Rheology, study of the deformation and flow of matter. If forces are applied to many kinds of solids in such a way as to change their shapes, and the changes are not too large, practically complete recovery occurs when the forces are removed. Examples of such solids are metals, most crystals, wood, etc. Other materials such as putty, butter, pitch, clay, etc., may be deformed by even small forces, and afterwards show incomplete recovery of shape. Moreover, although they resemble liquids in that they can flow under the continued

action of forces, these materials do not behave merely as ordinary viscous liquids, for which the laws of flow are simpler and have long been known. The more complex behaviour of materials such as those mentioned is the subject investigated by the rheologist.

Rheostat, electrical instrument devised for varying an electrical resistance (q.v.) in a circuit and used in different forms for controlling direct-current motors, as motor starters, and in wireless apparatus. In one type the circuit is connected with a movable arm, the free end of which is moved over a series of brass studs, each connected with a resistance coil and the end ones with the circuit.

Rhesus (Rh) Factor, substance (agglutinin) first discovered in 1940 in the red blood cells of the Rhesus monkey, whence the name R. F. is derived; it is present also in 85 per cent of humans, who are said to be Rh +, the remaining 15 per cent being Rh -. The R. F. is inherited, and the offspring of an Rh + father and Rh - mother may itself be Rh +. The Rh - mother reacts to the presence of the Rh + fetus by producing an agglutinin in her blood plasma. This agglutinin causes agglutination and destruction of Rh + red cells in a subsequent fetus, with results which are frequently fatal for the child. A similar undesirable reaction occurs if an Rh - person, previously sensitised by a transfusion of Rh + blood, is subsequently given a further transfusion of Rh - blood. See *The Rh Blood Groups* (Medical Research Council memorandum), 1948.

Rhesus Monkey, or Boonder (*Macacus rhesus*), macaque or catarrhine monkey common to N. India, in some parts of which it is attached to temples and regarded as sacred. It is from 18 in. to 2 ft. long, with a tail of 7 or 8 in. The hair is straight and fairly long, and is greyish or greenish brown. The face is flesh-coloured and the callosities bright red. This species is commonly kept as a pet, and is much used for research work in physiology. See RHESUS FACTOR.

Rheticus (real name, George Joachim) (1514-78), Ger. mathematician and astronomer, gave up his professorship of mathematics at Wittenberg for a time in order to supervise for Copernicus at Frauenberg the printing of *De Orbium Revolutionibus*, whose principles he enthusiastically endorsed. He is noted for the comprehensive and accurate tables of sines, cosines, and tangents, etc., calculated for every ten seconds and to ten places in his *Opus Palatinum de Triangulis*, pub. in 1596.

Rhetoric (Gk. *ῥητορικὴ*), originally the art of speaking effectively in public, but afterwards the meaning was extended so as to comprehend the theory of eloquence, whether spoken or written. It was first arranged and developed by the Gks. of Sicily, and Corax of Syracuse (c. 500 B.C.) is said to have been its originator. The earliest of the famous ten Attic orators was Antiphon. The earliest, however, really to make R. a methodical study was Isocrates, who defined his subject as 'the science of persuasion.' The greatest work on the subject either of ant. or modern

times is a treatise of Aristotle. He defines R. as the faculty of perceiving on any given subject what is best adapted to persuade. He then divides it into three parts: Persuasion, Language, or Expression, and Arrangement. Of persuasion there are three kinds, the deliberative, the demonstrative, and the judicial; with reference to each of which persuasion may be either general or special. In the second book he shows how, in certain cases, special persuasion depends upon the character of the speaker, and on the character and passions of the hearers. The third book deals with expression, and lastly arrangement is discussed. The peripatetic school followed Aristotle's method; but about 300 B.C. it was superseded by the Asiatic method, which in its turn was displaced by that of the school of Rhodes. Finally, the centre of rhetorical study shifted to Rome. See also ORATORY. See R. Volkman, *Die Rhetorik der Griechen und Römer*, 1874; J. Bascom, *Philosophy of Rhetoric* (new ed.), 1885; R. C. Jebb, *Attic Orators*, 1893; I. A. Richards, *The Philosophy of Rhetoric*, 1936.

Rheumatism, general term for a number of diseases characterised by pain in the joints and muscles, and usually initiated by exposure to cold or wet. The following disorders may be grouped under the name R.: rheumatic fever; subacute R.; muscular R., including lumbago; sciatica; rheumatoid arthritis; osteoarthritis; and gout. *Acute rheumatism*, or *rheumatic fever*, bears sev. characteristics which point to an infective origin. Poynton and Paine have given the name *Diplococcus rheumaticus* to a micro-organism which has been found in lesions of the joints in rheumatic persons; but, although the probability of a microbe origin is generally admitted, there is considerable diversity of opinion as to whether the causative organism has been isolated. The immediate cause of acute R. is almost invariably exposure to cold or wet, particularly when the subject is in a debilitated or fatigued state. Heredity seems to be a predisposing cause, and the possession of a rheumatic constitution, whatever form it takes, renders a person peculiarly liable to an attack. It is a fairly common sequel of scarlet fever. It is more common in temperate climates than in extreme, but alternations of high and low temp. are favourable to the development of the disease. It seldom attacks children under ten or adults over forty, and apparently affects more males than females. The symptoms vary to some extent with respect to children and adults. In adults there are moderate febrile symptoms: the pulse is quickened, and the temp. is raised, though seldom above 102°. There is a peculiarly acid perspiration and the urine is acid and scanty. The tongue is furred and the appetite diminished. The most painful symptom is the inflammation of the joints, which usually begins with one joint and then spreads to others, often symmetrically. In children the joint inflammation is not so pronounced, and the pains may be localised in certain muscles. There are no

acid sweats, and the other symptoms are less intense than in adults. The most usual complications, which form the most serious feature of the disease, are chorea, or St. Vitus's dance, in children, and endocarditis, more rarely pericarditis, pleurisy, and peritonitis in both adults and children. The iris and conjunctiva may also be affected, and, in adults particularly, a sudden hyperpyrexia may cause alarm. The attack may be over in a few days, or it may be prolonged for some weeks; there is also possibility of a relapse, and one of the commonest after-effects in children is a chronic cardiac weakness. As regards treatment, the patient should be kept between blankets, though lightly covered. The diet should be light and nourishing. The joints should be comfortably disposed and wrapped in cotton wool or gauze; but relief from very acute pain is obtained by fixing the joint by means of splints. The drug found to have most effect on the arthritic symptoms is salicin or salicylate of soda. Antacids are also of value. If hyperpyrexia occurs recourse should be had at once to the cold pack of a similar measure. Methyl salicylate and a mixture of chloral menthol and camphor are useful applications to joints. Oil of wintergreen (which contains methyl salicylate) is a well-established household remedy. These remedies are effective in reducing temp. and relieving pain, but are probably of no effect in diminishing the risk of heart complications. Endocarditis, accompanied by such bacteria as *Streptococcus viridans*, can be treated with penicillin. Aspirin has been found to be of considerable value in cases of chorea. Tonics are required in convalescence when there is anaemia or debility.

Sub-acute rheumatism is usually the effect of the persistence of the joint lesions produced in an acute attack. The joints become stiff, with more or less pain, and the condition often resists treatment over a protracted period. *Muscular rheumatism* (or *fibrositis*) is not necessarily preceded by an acute or sub-acute attack. Certain muscles are affected, the commonest being those of the small of the back (*lumbago*), the ribs (*intercostal rheumatism*), and one side of the neck (*stiff neck*). Aspirin and general tonics are recommended for chronic R., and good effects often follow a course of spa treatment. Septic foci, such as decayed teeth or infected tonsils, are a common cause and rapid improvement often follows their removal. *Sciatica* is R. or neuralgia (q.v.) of the sciatic nerve in the thigh. *Rheumatoid arthritis*, or rheumatic gout, has probably little connection with R. It is characterised by an inflammatory overgrowth of the cartilages of the joints, leading to the formation of nodular masses and immobility of the joints. Treatment is unsatisfactory, consisting chiefly of attention to the general health and careful nursing. Recent work by Mrs. E. C. Kendall and P. S. Hench in the U.S.A. has indicated that rheumatoid arthritis (and possibly other diseases also) may be caused by a shortage of the hormone cortisone (compound E),

normally secreted by the cortex of the adrenal (suprarenal) bodies. In 1949 apparently successful trials of cortisone in the treatment of rheumatoid arthritis were reported by the Mayo Clinic, Rochester, Minnesota, but supplies are at present very limited, though attempts to synthesise it from bile acids, and also from certain plants, are being made. The plant now being investigated as a possible source of cortisone is *Strophanthus sarmentosus*. It is known that the adrenal bodies are controlled by the pituitary gland of the brain, and it may be possible to isolate a pituitary hormone which will stimulate the production of cortisone by the patient himself. *Osteoarthritis* is chronic R. of the joints; it may follow an attack of rheumatoid arthritis, or result from some injury or inflammation of the joints. The various forms of treatment are aimed chiefly at preventing an exacerbation of the condition. *Gonorrhoeal rheumatism* is an inflammation which occurs in association with gonorrhoeal urethritis. Usually one joint only is affected, and the disease runs a chronic course with considerable pain. See also ARTHRITIS; HIP-JOINT. See H. W. Crowe, *Rheumatism*, 1934, and C. Jeffery, *Rheumatism: its Causes, Prevention, and Treatment*, 1940.

Rheydt, tn. of Rhineland, Germany, 2½ m. S.S.E. of Munchen-Gladbach. It manufs. cotton goods and machinery, and has printing and electrical works. From 1929 to 1933 it was amalgamated with Gladbach, but was re-established as a separate tn. after pressure by Goebbels (q.v.), who was born there. Pop. 77,300.

Rhin, Bas-, dept. of France, in Alsace-Lorraine, formed during the Fr. Revolution. It was incorporated into the Ger. Empire after the Franco-Prussian war in 1870, and restored to France after the First World War. It contains eight arrons., these being Erstein, Hagenuau, Molsheim, Saverno, Sélestat, Strassburg, Strassburg-Campagne, and Wissembourg. Strassburg (q.v.) is the cap. The Rhine runs along its E. boundary in a N.E. direction. There was severe fighting in the dept. late in 1944. The dept. contains the Hagenuau Forest. Area 1848 sq. m. Pop. 673,300.

Rhine (Lat. *Rhenus*, Ger. *Rhein*, Fr. *Rhin*, Dutch *Rijn*), chief riv. of Germany and one of the most important in Europe. It is about 820 m. in length, of which 280 m. are in Switzerland, 430 m. in Germany, and 110 m. in Holland; it drains an area of 86,500 sq. m. Rising in Switzerland and flowing W.N.W. across Europe, it separates that country from Germany, flowing through Germany and the Netherlands to the North Sea. It proceeds N. from its source to Mt. St. Gothard to Lake Constance, then W. over the falls of Schaffhausen to Basle, where, on its l. b., it receives the Aar. Turning N. it flows through the Vosges and the Black Forest, and receives on its r. b. the Neckar and Main. At Mainz it turns W., and N. at Bingen, where, on its l. b., it receives the Moselle. From Koblenz it becomes a slow winding stream, and on

entering the low plains of Holland below Emmerich it proceeds W. It then divides itself into a number of separate branches, forming a great delta, and flowing into the sea by sev. mouths, the chief of which are the Waal and Lek, both of which unite with the Maas, the Yssel, and Vecht, which diverges to the (IJsselmeer) Zuyder Zee and the true R., which enters the North Sea below Leyden. The R. was the natural defence of the Rom. Empire against the Teutonic hordes, who, however, in the fourth century, swept away the elaborate fortifications which the Romans had raised. With the partition of the Frankish Empire of Charlemagne (843), the R. became a Germanic riv. France, however, through the peace of Westphalia, obtained a footing on the l. b. In 1801 the l. b. of the riv. was formally ceded to France, but not till the war of 1870-71 did Germany regain full possession of both banks of the R., and she ceded back her r. b. conquests, Alsace and Lorraine, after the First World War.

The R. was never the scene of any offensive, nor was it even approached by the Allies in the First World War, though after hostilities had ended bridgeheads on the riv. were occupied for some years by Fr., Brit., and Amer. armies (see also under COLOGNE). In the land operations under the command of Gen. Eisenhower on the W. front in the Second World War the R. was the main objective of the Allies. The allied campaign W. of the R. (Feb.-March 1945) was so well planned and fought that the operation of crossing the riv. proved easy, while the advance beyond into the heart of Germany was completed in five weeks. See further under RHINE PROVINCE; WESTERN FRONT IN SECOND WORLD WAR. See L. Febvre, *Le Problème historique du Rhin*, 1931; F. O. Rave, *Der deutsche Rhein, Wanderungen und Fahrten der Romantik*, 1938; and I. M.S.O., *Report by the Supreme Commander to the Combined Chiefs of Staff on the Operations in Europe of the Allied Expeditionary Force*, 6 June 1944-8 May 1945, 1946.

Rhine and Marne Canal, system connecting the Rhine and Marne, cut between 1838 and 1853. It is 225 n. long and runs from the Ill at Strassburg to Vitry-le-François, crossing the Meuse, Moselle, and Meurthe Rs.

Rhine and Rhone Canal, unites the two rivs. after which it is named. It was cut between 1783 and 1831, is nearly 220 n. long, and runs from the Saône, an affluent of the Rhone, to the Ill, near Strassburg.

Rhine, Confederation of the, see CONFEDERATION OF THE RHINE.

Rhineland, co. seat of Oneida co., Wisconsin, U.S.A., 96 m. S.S.E. of Ashland. It has lumber works, paper mills, and manufs. refrigerators. Pop. 8,500.

Rhineland-Palatinate, Land, see under RHINE PROVINCE.

Rhine Province, Rhineland, or Rhenish Prussia, former prov. of Prussia, bordering W. on the Netherlands, Belgium, and Luxembourg, with Westphalia and Liess-Nassau on its E. frontier. The area was 9478 sq. m. and the pop. 7,690,000. After

the Second World War, when the state of Prussia was liquidated (*see under PRUSSIA*) and a number of territorial redivisions took its place, portions of the Rhineland were assigned to the Brit., Amer., and Fr. zones of Germany: to the Brit. zone was assigned the N. Rhine area, including the governmental dists. (*Regierungsbezirke*) of Cologne, Aachen, and Düsseldorf (in 1946 included in North-Rhine Westphalia); to the U.S. zone, the ter. of the former Land or state of Hesse on the r. b. of the Rhine, and the Prussian prov. of Hesse-Nassau, including the city of Wiesbaden (in 1946 Land Hessen); to the Fr. zone, the Rhineland-Palatinate, including the former Land Hessen on the l. b. of the Rhine and the governmental dists. of Koblenz and Trier (Trèves) of the former Prussian Rhine Prov. (in 1946 Land Rhineland-Palatinate); and the Saar Dist., including the Saar Ter. as defined by the treaty of Versailles, enlarged in Oct. 1946 by a number of adjacent rural dists. of the former Prussian Rhine Prov. The area of the pre-1946 Rhineland was 9178 sq. m. and the pop. (estimated for 1939) 8,000,000. According to the census of the Ger. pop. held on Oct. 29, 1946, the area and pop. of governmental dists. and of the *K. P. Länder*, etc., were: Aachen, Cologne, and Düsseldorf, 12,640 sq. km. (4879 sq. m.), pop. 5,895,000; Hesse, 21,100 sq. km. (8144 sq. m.), pop. 4,064,000; Rhineland-Palatinate, 19,900 sq. km. (7681 sq. m.), pop. 2,761,100; Saarland, 2500 sq. km. (965 sq. m.), pop. 874,000. In April 1949 small frontier areas were ceded to Holland, Belgium, and Luxembourg.

The surface is mountainous in the E., W., and S., but in the N. of the prov. the land is fairly level. The highest peak is Walderbeskopf (2670 ft.) in the Hochwald Range, which trends from S.W. to N.E. in the S. of the prov. The Rhine and the Moselle are the prin. rvs., and these, with their numerous tribs., drain the country. Forests occupy 30 per cent of the total area, but there are fertile tracts and valleys, where the decayed volcanic rocks afford excellent soil for the vine, which is extensively cultivated. It contains the rich coalfields of the Ruhr, and other minerals include iron, silver, lead, zinc, copper, lignite, basalt, and manganese. The chief crops are cereals, hops, sugar, flax, and tobacco. Mineral springs occur in various parts of the prov., notably at Aachen and Bad Kreuznach. Manufs. are numerous and varied: cloth, woollens, velvet, silk, scut, muslin, linen, leather, wines, malt liquors, spirits, chemicals, pottery, and glass being the most important. There were also, before the Second World War, extensive iron works at Essen (including the famous Krupp foundries), Düsseldorf, Aachen, and Oberhausen, while R-masched and Solingen are seats of the cutlery manuf. The former cap., Koblenz, is superseded by Düsseldorf as cap. of Land North Rhine-Westphalia, other important tns. being Cologne, Wuppertal (Kilberfeld-Barmen), Trier, Aachen, and Bonn, chosen as the cap. of the W. Ger. Federal Republic

after the Second World War. The tn. of Bonn has a noted univ.

The retention of the Rhineland by Germany after her defeat in the First World War was a sore blow to France, and the resurgence of Ger. militarism and aggression between 1932 and 1939 inevitably suggests that unconditional retention was a blunder on the part of the Allies. Lloyd George, however, devoted his efforts, after the war, to a policy of conciliation designed to give the new Weimar Republic the best possible chance of converting Germany into a pacific and truly democratic country, a problem that again confronted the Allies after 1945. Poincaré from the beginning was completely sceptical of any such policy and he resented bitterly the fact that the article of the treaty of Versailles which secured the Rhineland for Germany remained indefeasible, although the consideration which had induced France to accept the position, viz. the promise of a pact of guarantee by the U.S.A. and Great Britain, was never fulfilled. Poincaré therefore tried, but in vain, to secure by an externally provoked movement of separation from within the Rhineland a reversal of the treaty decision and his occupation of the Ruhr on the pretext of a failure of coal deliveries, was, in the long run, equally fruitless, for his policy, which was really to reduce the potential strength of Germany, was reversed in the Fr. election in 1924. Thus was the stage set for a renewal of the war in 1939.

The Industrial tns. of the Rhineland suffered heavy raid attacks in the Second World War. In March 1943 Essen, with its Krupp's works, was first badly hit, and the Möhne, Eder, and Sorpe dams breached. 'Blockbusters' (g.v.) were used with much effect on Essen, Cologne, Düsseldorf, and other places. In the 1945 battle of the Rhine the first of these, and Dortmund, were again especially singled out (*see further under the various tns., and RUHR*).

In the land fighting the Rhineland first figured in the campaigns of the W. front in Sept. 1944, Amer. First Army troops entering Germany in the Trier region on Sept. 11, and in the Aachen area on the 12th, reaching the city of Aachen on Oct. 13. After the fall of Aachen, which was largely ruined, the First Army's offensive operations were curtailed until the Nov. offensives, which were mounted along the entire front. There was fierce fighting to overcome the dams which controlled the flooding of the Roer valley, and while these remained in Ger. hands progress was retarded; but the Amer. attack on the dams was launched on Dec. 13. Plans for the 1945 campaign envisaged an envelopment of the Ruhr, with the main thrust in the N., the unexpected capture of the Remagen bridge causing some modifications in the overall plan. Cologne was entered on March 5, Bonn fell on March 9, and by the 11th the l. b. of the Rhine was cleared from Koblenz to Andernach, and the stage set for the joint offensive of the Third and Seventh Armies. The Ruhr was enveloped from

the bridgeheads at Wesel and Frankfurt (see further under WESTERN FRONT IN SECOND WORLD WAR; WORLD WAR, SECOND).

Rhin, Haut-, dept. of France, in Alsace-Lorraine, formed during the Fr. revolution. Like Bas Rhin, it was incorporated in the Ger. Empire between 1870 and 1918. The six arrons. are Colmar (cap.), Altkirch, Guebwiller, Mulhouse, Ribeauvillé, and Thann. The Rhine forms the W. boundary of the dept. The dept. is fertile and densely wooded. It produces cereals, fruits, flax, etc. There are potash factories at Mulhouse. Area 1354 sq. m. Pop 471,700.

Rhinitis, see under NOSE.

Rhinoceros, genus of perissodactyl ungulates, of which five species still exist, three in Asia and two in Africa. A number of extinct forms have been



RHINOCEROS

identified, including four which inhabited Britain. Specimens of the woolly R. have been found imbedded in ice, the skin was without folds, and covered with hair and wool. The anterior horn was of remarkable size. The living Rs. are, with the exception of the elephant the largest and most powerful terrestrial mammals. The head is large and the skull elongated, the brain cavity is relatively very small, and they are of low intelligence, the senses of smell and hearing are highly developed. The limbs are moderately long and stout, with three toes on each foot. The hide is scantily covered with hair, the face bears one or two median conical and recurved horns, which are composed of a mass of epidermal cells. The two African Rs. are the 'Black' or prehensile-lipped species (*R. bicornis*), found mainly in the forests of the mts. and the arid bush, and the 'White' or square mouthed species (*R. sinensis*), which is a dull brown black in colour, and, though once common in S. Africa, is now confined to the Sudan, N.E. Belgian Congo, Fr. Equatorial Africa, W. Uganda, and Natal. These species differ from the Asiatic R. in the absence of folds in the skin and in the lack of incisor teeth in the front of their jaws, fighting when roused solely with

their horns, whereas the Asiatic kind attack with their lower tusks. The Asiatic species are *R. unicornis* and *R. sondaicus*, both of which are one-horned, and *R. sumatrensis*, which is two-horned and has a smooth skin and ears fringed with long hairs.

Rhinoplasty, plastic operation to replace lost tissue in the nose by tissue from some other part of the patient's body. In the Indian method, long known in the E., and introduced into Europe in 1814, a flap of skin is cut on the forehead, remaining attached to it by a small portion. It is then twisted round, so as to keep the external part outside, and moulded over pieces of oiled lint. The lower part of the septum is usually formed from the skin of the upper lip. When adhesion has taken place the attachment to the forehead is cut through or trimmed so as to reproduce the shape of a normal nose. In the It. method, devised by Pagliacozzi of Bologna in the middle of the sixteenth century, a flap is cut in the patient's arm and the skin moulded to form a nose. The arm must be bound to the face while adhesion is taking place, after which the tissue connecting arm and nose is severed.

Rhinoscopy, visual examination of the interior of the nose. It may be done by concentrating a ray of light from a frontal mirror through the nostrils, or by introducing a small mirror fitted with a long handle by way of the mouth into the naso-pharynx. Lennick's urethroscope may also be adapted to R. Examination of the anterior nares is called anterior R., that of the posterior nares, posterior R.

Rhipael Montes, see URAL MOUNTAINS.

Rhizomes, see under ROOT.

Rhizopoda, form of Protozoa, between Infusoria and Sporozoa, being neither very active nor very sluggish. They have outflowing processes in the form of threads or blunt lobes, which are used in locomotion and capturing food. R. include Amoeba, Foraminifera (q.v.), Radiolaria, and sun animalcules.

Rhodanthe, genus of Helychryseae. The one known species, *R. manglessii*, has flowers of the dry and unfading kind called everlasting, roseate or purple in the upper part and silvery below. It is found in W. Australia and has been introduced into Brit. greenhouses as a charming half hardy ann. 9 to 12 in. high, with white or pink daisy like flowers. The R. will grow in the open air in a temp. between 60° and 80° F.

Rhodanus, see RHONE.

Rhode Island (Little Rhody), smallest of the United States of N. America, and one of the six New England states which formed part of the original thirteen states of the Amer. Union. It lies between Massachusetts on the E. and N., and Connecticut on the W., while its S. shores are washed by the Atlantic. The climate is mild and agreeable. There are no mts. In R. I., the N. and E. portions of the state are hilly and the land slopes to the S.; the highest point is Burpee Hill near Gloucester. Other hills are Woodcock Hill, Mt. Hope, Diamond Hill, and Hopkings Hill. The three largest rvs. are the

Blackstone, Pawtuxet, and Pawcatuck. Black Is., a favourite resort, is 10 m. S.W. of Point Judith. R. I. has 45 m. of Atlantic Coast, and Narragansett Bay affords 350 m. more coastline. It is the most densely populated state, and exceeds all others in its industrial output *per capita* and in its *tn. pop.* It is over 97 per cent urb. Brown Univ., founded in 1764, has some 5000 students; there are two state colleges, and Providence College, founded by the Dominicans, with 2500 students. Manufs., which form the staple industry of the country, consist of cotton, woollen, worsted, and mixed textiles, silk, jewellery, and machinery for the textile trade. There are also dye works. Manufactured goods were valued at over \$516,000,000 a year. Providence, Woonsocket, and Pawtucket are the chief seats of the textile trade, which was introduced in the seventeenth century. Some farming is carried on. There are some 213 m. of railway and eleven airports.

R. I. was first settled in 1636 by Roger Williams and others who were expelled from Massachusetts because of their religious opinions. Settlers of every creed were admitted. In 1647 a patent was granted for the government of the settlement, and a charter in 1663. In 1790 the state accepted the federal constitution and entered the union as the thirteenth original state. The General Assembly consists of a Senate of forty-four members and a House of Representatives of a hundred members, both elected for two years, as are also the governor and lieutenant-governor. The state is represented in the national congress by two senators and two representatives.

The state cap. is Providence (1910, 253,500); other prin. tns. are Pawtucket (75,800), Woonsocket (49,300), Cranston (47,000), E. Providence (32,100), Newport, a watering-place (30,500), Warwick (28,700), Central Falls (25,200), W. Warwick (18,100), N. Providence (12,100). The pop. of R. I. is 761,000. The foreign-born whites in 1940 numbered 137,500 (19.3 per cent of the total). The Negro pop. was 1.5 per cent. There were over 28,000 Its., 23,000 Fr. Canadians, 19,000 Eng., and 11,000 Irish, who are a powerful influence in the politics of the little state. See *Book of Rhode Island* (issued by State Bureau of Information, Providence), 1930; C. Carroll, *Rhode Island: Three Centuries of Democracy*, 1932; and Federal Writers' Project, *Rhode Island: a Guide to the Smallest State*, 1937.

Rhoden, or Rhodes, Inner and Outer, see APPENZELL.

Rhode - Saint - Genève, see SINT - GENESIS - RODE.

Rhodes, Cecil John (1853-1902), Eng. statesman. b. at Bishop's Stortford and educated at Bishop's Stortford Grammar School. In 1869 his health broke down, and he went to Natal to join his brother Herbert on a cotton plantation. In 1873 R. returned to England and went to Oriel College, Oxford, but he came down in a few months, his heart and lungs being affected. He did not take his name off the books, but kept terms whenever he

could, and took his degree in 1881. He had a love for the classics, and in S. Africa usually had with him a vol. of one of his favourite authors. In Kimberley in 1874 he, with a partner, Rudd, had a big holding in the goldfields, where his prin. rival was Barney Barnato (q.v.). In 1880 R. amalgamated sev. smaller companies into the De Beers Mining Company, and Barnato, working on the same lines, formed the Barnato Mining Company. There was an homeric struggle between these corporations, but in 1888 they were amalgamated under the style of De Beers Consolidated Mines, with R. as chairman. R. was as anxious as Barnato to make money, but his endeavours to possess a vast fortune were deflected not only by commercial motives. He was a man of dreams, which, however, were based upon



CECIL JOHN RHODES

concrete ideas, and his prin. objective was a federated S. Africa under the Brit. flag. He entered public life in S. Africa in 1881 when he took his seat in the Cape legislature. He gradually obtained the respect and admiration of his colleagues, and in a few years became, by sheer force of character, one of the dominant spirits. All his efforts were directed towards the extension of Brit. rule and influence, and he was largely responsible for the annexation of Bechuanaland in 1884. In his efforts to secure N. expansion, R. was favoured by the fact that he was virtual dictator, with large powers, of the chartered company, in whose interest in 1890 Dr. Jameson estab. himself at Salisbury. In the same year R. became Prime Minister of the Cape, and the occupancy of those dual positions made him the most influential man in the continent. He held office until the famous 'Jameson Raid' compelled his retirement. The select committee of the House of Commons appointed to examine the matter found R. guilty of grave breaches of duty both as Prime Minister of the Cape and

as managing director of the chartered company. When the S. African war broke out in 1899, R. at once went to Kimberley, which, shortly after his arrival in Oct., was besieged until the middle of Feb. He died on March 26, 1902, and was buried, according to his instructions, in the Matopo Hills. In 1912 a monument to his memory was erected on the Grootte Schuur slopes of Table Mt. R. left a fortune of 6,000,000 sterling. By his will his house Grootte Schuur was bequeathed as a residence for ever for the Prime Minister of a federated S. Africa. He instituted scholarships at Oxford of the value of £300 each (the total endowment being over £50,000 a year—for students of the U.S.A. and the colonies, such students to be elected, not merely for academic attainments, but for general all-round fitness. In his life R. had his detractors, but now his great qualities are almost universally admitted. R. was an imperialist of the full post-Franco-Ger. war of 1870 type, when the period of liberal advance in Europe had given place to power politics. He was bent on carving up Africa for England's gain and the outwitting of rivals, especially Germany, but he sincerely believed that 'his' rule was best for Africans. In political opinions he was more Radical than Conservative. Thus he supported Irish home rule, and wished to see S. Africa become a dominion with the maximum degree of self-government, but a Brit. dominion nevertheless. His career had moulded him. In the struggle for the survival of the fittest at Kimberley he had been engaged in big business; and S. African big business, which made millionaires from nothing in a few years, was not conducted on principles approved by the fastidious. 'Rhodes had no moral recoil from methods which would certainly not have been entertained by a man with a background of official or service life and its standards of conduct' (J. A. Williamson, *Great Britain and the Empire*, 1944). He was, undoubtedly, a visionary, and, by the provisions of his will, he made manifest his hope that one day there would be a union, not necessarily official, between all Eng.-speaking races. See lives by Sir T. E. Fuller, 1910; Sir L. Michell, 1910; A. F. B. Williams, 1921; Sarah G. Millin, 1933; J. G. McDonald, 1934; and H. Baker, 1934.

Rhodes, James Ford (1818-1927), Amer. historian, b. at Cleveland, Ohio, and educated at New York Univ., univ. of Chicago, Collège de France, 1867, and the School of Mines, Berlin. He was engaged in his father's ironworks at Cleveland, 1870-85. He then devoted himself to hist., and among his works are *History of the United States from the Compromise of 1850* (1893-1906); *History of the Civil War* (1917); *History of the United States from Hayes to McKinley* (1919, 1920); *The McKinley and Roosevelt Administration* (1922).

Rhodes, Gk. Is. of the Levant, lying 12 m. off the coast of Izmir (Smyrna), Asiatic Turkey. It is 46 m. in length, with a maximum breadth of 24 m. Its surface is mountainous, diversified with fertile valleys, producing fruit, especially

fine grapes, olives, tobacco, vegetables, and wine. Other products are oil, leather, sesame seed, and sponges. It is a beautiful Is., and has been called the Is. of Roses, even though roses scarcely figure among the fine tropical flowers, like the hibiscus and the purple bougainvillea. The Is. enjoys the most beautiful climate in the Mediterranean; but its once famous harbours have been allowed to decay, and its commercial importance has dwindled. It was, however, improving in the late 1920s, trade being then chiefly with Egypt, Italy, and Turkey. Its cap. is R., an archbishop's see and formerly a strong fortress, encircled by triple walls and moats. At the time of Alexander the Great it was 9 m. in circuit, and was considered one of the finest cities in the world. Its walls are now in a ruinous condition, and it occupies only a fourth of its former area. At the mouth of its harbours stood the celebrated 100-ft. high Colossus of R., one of the 'seven wonders', an enormous statue of bronze, which was thrown down by an earthquake in 224 B.C. The old city of R. was built by the crusader knights; Mussolini added most of the modern parts. The famous castle of the city of R., which was built by the Knights of St. John in the fourteenth century, was rebuilt by the Is. in 1937-40. Notable, too, are the ruins of the medieval castle at Lindus, with remains of the anct. acropolis. Of the fifty vils. on R. one is Turkish and the other forty-nine are Gk. The antiquity of the Gk. civilisation in R. is evident. The ruins of three Bronze Age cities remain, each with its mt. citadel overlooking the sea. Area of Is. 550 sq. m. Pop. of Is. 36,500; pop. of tn. 16,000.

R. has had an eventful hist. It was founded by Gk. settlers from Argos. It steadily increased in importance, and as early as the seventh century B.C. it was carrying on a prosperous trade with Spain, Sicily, and Italy. It came under the sway of the Persians in the fifth century B.C., but was wrested from them by Alexander the Great in 331 B.C. It was plundered by Cassius in 43 B.C. for siding with Caesar, and was devastated by an earthquake in A.D. 157. In 665 the Saracens occupied the Is., continuing in possession until 1309, when they were driven out by the Knights of St. John of Jerusalem, who resisted many sieges by the Turks, to whom it ultimately fell in 1523. In 1912, during the Tripoli war, it was occupied by Italy, and in 1921 it was ceded to that country with other Aegean Is. The Gks. took over the Dodecanese, including R., in April 1947. See C. Torr, *Rhodes in Ancient Times*, 1885, and *Rhodes in Modern Times*, 1887, and Baron de Bulaire, *Rhodes of the Knights*, 1909.

Rhodesia, Northern, Brit. protectorate, separated from S. Rhodesia by the Zambezi R., and bounded on the S. by Bechuanaland and Portuguese E. Africa. Nyasaland bounds it on the E., Tanganyika Ter. and the Belgian Congo on the N., and Portuguese W. Africa on the

W. It is watered by the Zambesi, Kafue, Luangwa, Chambesi, and other rivers. Mostly consisting of high tableland, thinly forested, only the valleys of the Kafue, Luangwa, and lower Zambesi are below 4000 ft. in altitude; while the Tanganyika plateau in the N.E. is 5000 ft. in height, and in the N. part of Kasempa in the N.W. 6000 ft. is reached. Lake Bangweulu is entirely in the ter. and Lakes Mweru and Tanganyika lie on its N. boundary. There are wide areas of good arable and pasture land, though the tsetse fly makes farming almost impossible in large areas of Kasempa, and makes transport a problem in the N.E. The Kafue valley is the best farming area, with centres at Mayabuka and Lusaka. Maize, tobacco, coffee, wheat, cotton, oil-seeds, and citrus and other fruits are grown, and cattle and pigs are reared. Mining is carried on at Broken Hill, Ndola, Kansanshi, and other centres. Copper, zinc, cobalt, vanadium, gold, and silver are the chief minerals produced, and the total value in 1947 was £23,521,000, of which copper was the most valuable, followed by zinc and lead. Mineral exploitation has brought labour problems in its train and led to unrest in the 'copper belt,' but welfare measures, education, and improved wage conditions, together with the development of trade unions, are bringing about a more settled state of affairs. The chief exports are copper, cobalt, vanadium, wood, zinc, tobacco, hides and skins, and gold. The Rhodesian Railway traverses the ter. from Livingstone on the Zambesi in the S. to the Belgian Congo in the N., passing through the tns. of Kalomo, Mayabuka, Lusaka, and Broken Hill; Fort Jameson, near the E. frontier, Abercorn, on Lake Tanganyika, Fort Rosebery, W. of Lake Bangweulu, and Lealui, on the upper Zambesi, are other important tns. Livingstone was the cap. until 1935, when the administration was transferred to Lusaka, 30 m. N. of the Kafue R. The most important centres are Broken Hill, Fort Jameson, Livingstone, Lusaka, Mayabuka, Abercorn, Kasama, Ndola, Luanshya, Mufulira, Kitwe, and Chingola.

The ter., until 1911 two provs., N.E. and N.W. Rhodesia, was governed by an administrator under the Brit. S. Africa Company until 1924, when it was taken over by the Crown and a protectorate estab. A governor was then appointed, assisted by executive and legislative councils. For administrative purposes the ter. was formerly divided into nine provs., each of which was under a prov. commissioner responsible for his prov. to the governor. The provs. were grouped together under five prov. commissioners in 1933 and the number of provs. reduced to five, but the number has since been increased to six. The provs. are divided into dists., under the charge of dist. commissioners responsible to the prov. commissioners. Barotseland in the W. is a native reserve. Area 287,640 sq. m. The European pop. at the 1946 census was 21,800, and the estimated African pop. 1,641,700. The legislature has wide

powers, but provision regarding natives is in the hands of the governor. The large native pop. is given special protection, and local administration is, as far as possible, in the hands of their own chiefs and headmen, who function as native authorities in the courts.

On the early hist. or even late hist. of N. R. there exists little but travellers' tales and these less than a century and a half old. The first authentic hist. of what is now N.E. Rhodesia is taken from the diaries of Dr. Lacerda, Portuguese governor of Sena, who led an abortive expedition to Lake Mweru (1798) where he died, but leaving his diaries to be brought back by Father Pinto. In the early nineteenth century Portuguese traders brought back stories of a great interior kingdom of the Lunda people, extending from Lake Mweru to Barotseland (q.v.) and including all the country drained by the upper Congo. Very few historical facts are known concerning it. The first expedition of any geographical value was that of Livingstone's famous missionary journey of 1851 and his discovery of the Victoria Falls. Later explorers, who retailed stories of native barbarism and large herds of game, were Serpa Pinto, Cameron, Selous, and Arnot. The great majority of the present native pop. is of Bantu origin and descended from invaders who swept over the country about A.D. 1700 or somewhat latter. The story of these invasions is lost in tradition but their traces remain in the great number and diversity of races and languages in N. R. The pop. of N. R. has been classified into some seventy or more different tribes, the most important being the Bemba and the Ngoni in the N.E. dists., and there are about thirty different dialects in use, but many of these vary very slightly. Nyanja is in use as the official language of the police. The chief invaders of the early nineteenth century were the Arabs from the N., the Ngoni Zulus fleeing from Chaka and the Kololo, who fought their way from the S across the Zambesi and founded a kingdom which was distinguished by a comparatively high degree of social organisation. One of the more successful of the invading tribes was the Lozi under Lewanika (q.v.), who asked for and obtained the protection of the Brit. Gov. in 1891. In 1900 the chartered company acquired certain trading and mining rights over Lewanika's dominion in consideration of an ann. subsidy and other advantages. During this time the slave trade estab. by the Arabs continued unchecked and its influence spread from Lakes Nyasa and Tanganyika over the whole of N. R., but with the final estab. of the administration of the Brit. S. Africa Company the slave traders quickly disappeared from the country. The status of the conquered tribes under Lewanika's dominion was that of a mild form of slavery; this social servitude was ended by Lewanika himself, who in 1906 agreed to the emancipation of the slave tribes.

Before 1890-1900 the whole ter. had been vaguely included in the charter

granted to the Brit. S. Africa Company, but in 1899 and 1900 orders in council put the company's administration of the W. and the N.E. portions of the country, respectively, on a firm basis. These two ters. were amalgamated in 1911 under the designation of N. R. In recent years there has arisen a movement for the amalgamation of N. and S. Rhodesia (and Nyasaland), but the report of the commission under Lord Bledisloe (1938-39) was opposed to early amalgamation, and the general view is that there is need for much further progress in the native policy and in the native development of both ters. before amalgamation could be approved in principle. The native pop. in both N. and S. Rhodesia does not favour union, and the different policies towards natives in the different ters. make an obstacle to amalgamation. *See also under RHODESIA, SOUTHERN.*

Defence.—The forerunner of the present N. R. Regiment was an Indian police force raised and equipped on behalf of the Brit. S. Africa Company, in 1891, and for some time afterwards the mainstay of the force were Sikhs. Later still native recruits were enlisted from the Batoka, Balia, and Barotsche with N.C.Os. and officers from the Brit. S. Africa police, the official force of the chartered company. During the First World War the military section of the police were mobilised and took part in campaigns until 1919. In 1933 the military section of the N. R. police became the N. R. Regiment. Despite this re-organisation the force remained under the N. R. Police Ordinance, and the appointments of personnel remained the responsibility of the Colonial Office. In 1937, however, it was decided to model the N. R. Regiment on the pattern of other African forces, and as a result the N. R. Regiment Ordinance was passed with the prin. result that European personnel were seconded to the regiment from the regular army. In 1938 the N. R. Regiment European Reserve was formed, and later an African Reserve was formed. On the outbreak of the Second World War the 1st Battalion served in Brit. Somaliland and later in the Far E.; the 3rd Battalion served in E. Africa, Madagascar, and Burma.

See C. Gouldsbury and H. Sheene, Great Plateau of Northern Rhodesia, 1911; H. M. Holo, The Making of Rhodesia, 1926; W. D. Gale, One Man's Vision: the Story of Rhodesia, 1935; T. G. Standing, The Story of Rhodesia, 1936; Labour Conditions in Northern Rhodesia (report) by G. St. J. Orde Browne, 1938; Lord Harley, An African Survey, 1938; Rhodesia-Nyasaland Royal Commission Report (H.M.S.O.), 1939; Northern Rhodesia Official Handbook, 1948; Northern Rhodesia: Report, 1946; Report, 1947 (H.M.S.O.), 1948.

Rhodesian Regiments, see under Defence in RHODESIA, NORTHERN, and RHODESIA, SOUTHERN.

Rhodesia, Southern, Brit. self-governing colony in S. Africa. It lies between the Limpopo R., separating it from the Transvaal on the E., and the Zambesi, separating it from N. Rhodesia, on the N.; Portu-

guese E. Africa and Bechuanaland bound it on the E. and W. It is composed of the two provs. of Matabeleland and Mashonaland. Of its total area of 150,333 sq. m., nearly 100,000 sq. m. have an altitude of over 3000 ft., and about 26,000 sq. m. of over 4000 ft., the highest land stretching from the N.E. to the S.W. The lowest areas are in the valleys of the Sabi, Lundi, and Limpopo Rrs. near the S.E. frontier. These three rivers, with their numerous tribs., water the S. part of the country, the N. being watered by the Zambesi and its tribs. There is much excellent pasture land, cattle, sheep, and pigs being reared, and dairy-farming carried on; wide areas are under crops, of which the chief are maize, tobacco, ground-nuts, fodders and fruit of all kinds, citrus fruit predominating. The mineral resources of S. R. are extensive, gold being of first importance, the output being valued at over £4,500,000 in 1947; asbestos, chrome ore, coal, silver, mica, diamonds, lead, and copper are also mined. The mineral rights of the Brit. S. Africa Company in S. R. were purchased by the gov. in 1933 for £2,000,000. Other industries include brick and tile works, iron and brass foundries, factories for making cigarettes and tobacco, soap and candles, bacon, mineral waters, creameries, cotton ginneries, cement works, etc., and electric light and power works. The chief exports of local origin (in addition to gold) are asbestos, tobacco (twice the value of gold exports), chrome ore, coal, maize, fresh and preserved meat, hides, and citrus fruit. Communications are good, the total railway mileage being 2700. The Rhodesia Railway connects Bulawayo with Cape Town, and runs from Bulawayo in a N.W. direction to Livingstone in N. Rhodesia, crossing the Zambesi at the famous Victoria Falls. Bulawayo is also connected with Salisbury, 300 m. to the N.E., and branch lines run to West Nicholson, Shabani, Selukwe, Victoria, Sinjoia, and Shamva. The Mashonaland Railway connects Salisbury with Beira in Portuguese E. Africa. Umtali being the frontier tn. The Brit. S. Africa Company has a controlling interest in the Rhodesian railway system. There are also road motor services over 1960 m. of road. Salisbury is the cap. and Bulawayo comes next in importance; other centres are Umtali, Gwelo (a railroad junction), Gatooma, Que Que, Wankie (a coal-mining tn. in the N.), Fort Victoria, Selukwe, Shabani, and Bindura.

S. R. stands politically in a position intermediate between that of a dominion subject to no external control and a crown colony in which the legislature is responsible to the imperial gov. The aim of Cecil Rhodes was the early estab. of responsible gov., but the constitution granted by order in council of 1894 provided for a legislature with only a minority of elected members, and expressly reserved control over native affairs to the imperial gov. On the expiry of the charter of the Brit. S. Africa Company in 1914 the only alternative to renewal seemed to be incorporation in the Union

of S. Africa, but in 1922 a referendum resulted in a majority for independence, and since then it has been accepted that the future of S. Rhodesia is more appropriately bound up with that of the areas to the N. of it. S. R. was formally annexed to the Brit. Crown in 1923 and the new constitution of that year creating responsible government came into force in 1924. The difference between S. R. and those ters. which can claim to have full dominion status (*q.v.*) lies in this: that while the former has an executive gov. responsible to its elected legislature (formerly the Legislative Assembly but since 1933 called Parliament), certain

the chief justice, and the chief native commissioner. In 1934 the Parliament of S. R. passed a resolution urging the grant of full responsible government to the colony, though it was agreed that the demand for full dominion status, involving control of foreign relations, was premature. In the result a draft constitution embodying certain amendments (such as those relating to native affairs, noticed above) received the royal assent as an act of the S. Rhodesian Parliament in Oct. 1937. Under the constitution a native council may be estab. in any native reserve representative of the local chiefs, and native residents, to advise the governor



High Commissioner for Southern Rhodesia

A NATIVE KRAAL IN SOUTHERN RHODESIA

specified classes of its legislative acts are still subject, under the instructions issued to the governor, to reservation for the pleasure of the Crown and to disallowance by it. Further, certain executive acts, relating chiefly to the conduct of native affairs, are subject to the assent of the Crown. The Crown in this case acts on the advice, not of the S. Rhodesian Cabinet, but on that of ministers in the United Kingdom. A peculiarity of the constitution was that the supervision of the imperial gov. over native affairs was exercised through the high commissioner for S. Africa and native lands were vested in him; but by an amendment of 1937 the high commissioner relinquished these supervisory powers and the trusteeship of the native reserves. Of these powers the more important are now exercised by the secretary of state, while the trusteeship of these reserves is vested in a board of trustees composed of a chairman nominated by the secretary of state,

and manage such local affairs as may be entrusted to it, and in 1937 an Act was passed for the estab. of such councils. The legislature may amend by a two-thirds vote the letters patent setting up the constitution, with certain exceptions (relating to reservation of Bills by the governor and native administration). Under the electoral law of 1937 the franchise was extended to all Brit. subjects not under twenty-one years of age, subject to certain qualifications of occupancy or ownership of property which, in effect, exclude most of the native pop. S. R., having achieved responsible government, has its own cabinet of ministers, who are responsible to a freely elected legislature. Its Parliament is in control of almost all internal matters, but external affairs remain the responsibility of the gov. in the United Kingdom. Legislation affecting the enormous native pop. is also subject, as we have seen, to some measure of supervision by the home gov.,

but in practice this control is conditioned by the fact that the financial implementation lies with the local legislature. It is of interest to recall that in 1947 King George, on his return from S. Africa, opened the S. Rhodesian Parliament (April 7), when he announced that a defence council was to be estab., to enable the colony to co-ordinate plans with the United Kingdom and adjoining Brit. ter. Since the grant of responsible government, S. R. has made great progress. Considerable expansion has taken place in agric. and mining production, a large volume of immigration has been absorbed, and the railway system has been widely extended.

There is a high court composed of a chief justice and three judges, with criminal and civil jurisdiction. Single judges are stationed at Salisbury and Bulawayo, and twice a year sessions are held at sev. of the other prin. tns. There are also a number of prin. courts of magistrates, assistant magistrates' courts, and sev. periodical courts. Native commissioners have jurisdiction in civil and criminal matters in which natives only are concerned. A joint court of appeal for S. and N. Rhodesia was estab. in 1939. Education in 1917 was provided for in 100 schools for European children, 15 for coloured, and 2028 for native. The pop. in 1916 was estimated at 1,764,000, comprising 82,400 Europeans, 7500 Asiatic and coloured, and 1,674,000 native. Immigration increased greatly after the end of the Second World War.

The early hist. of the country has given rise to much conjecture, for ruins of at least 500 anct. buildings of unknown origin have been found. The earliest are the most skilfully constructed, but by whom they were built and when (except that it was before the sixth century A.D.) is unknown. The finest ruin is at Zimbabwe, and it and others at Mumbo, Tati, and elsewhere are believed to have been strongholds erected by Bantu people about four centuries ago, to protect gold washings, of which there are traces extant. During succeeding centuries Arabian traders kept up communication with Mashonaland, but the country was little known to Europeans until the late nineteenth century, though the Portuguese, ever since their occupation of the coast, had exported gold from its mines. In 1837 the pastoral Mashona tribe was conquered by the disciplined armies of the Matabeles, a branch of the Zulu Kaffirs, who estab. here a military despotism. In 1889 the Brit. S. Africa Company obtained a charter and, largely owing to the energy of Cecil Rhodes, annexed Mashonaland; the turbulent Matabeles were conquered in 1893, and in 1896 the country was formally given its name of Rhodesia, after Rhodes. (For the hist. see also under MASHONALAND; MATABELELAND; RHODESIA, NORTHERN.)

It was in 1911, as stated in the article on N. Rhodesia, that the ter. under the Brit. S. Africa Company's rule was divided into N. and S. Rhodesia. But in recent years there has been a growing

movement for the amalgamation of the Rhodesias and Nyasaland into a Rhodesian or Central African dominion. The Bledisloe Commission, however, which reported in 1939, did not favour amalgamation within any definite period, though it recommended closer collaboration through an interterritorial council, and suggested that the imperial gov. might accept the principle that identity of interests would lead ultimately to political union. In the meantime the report recommended amalgamation of N. Rhodesia and Nyasaland, and contemplated the eventual inclusion within S. R. of the N. portion of Bechuanaland. (For the movement for amalgamation of S. R. and N. R. as a dominion of the Commonwealth, see under NORTHERN RHODESIA.)

Defence.—S. R. has produced many units during the various wars over the past half-century. In 1899 with the outbreak of the S. African war and the departure from the ter. of most of the male pop. to enlist in the home forces it was decided to raise a Rhodesian Field Force for the protection of the ter. The chartered company (Brit. S. Africa Company) organised the enlistment of the force, and the home government paid for its cost. More than 2000 of the 6000 men enlisted were recruited from Australia, New Zealand, and Tasmania. This force played a notable part in the relief of Mafeking. At the outbreak of the First World War the 1st Rhodesia Regiment was formed. It took an effective part in the S.W. African campaign against the Gers. In the following year the 2nd Rhodesia Regiment was formed, and fought in the E. African campaigns. In 1916 the 1st Rhodesia Native Regiment was formed: many of the askari were Matabele, the officers and N.C.Os. being recruited from the Native Affairs Dept. and from the Brit. S. African Police. The S. R. Column also came into being and operated in the ter. to the N. of the present N. Rhodesia. S. R. had 11,000 males between fifteen and forty-four, and of these 6329 served in the armed forces during the period 1914-19. On the outbreak of the Second World War a large number of men from S. R. were enlisted for service with the King's African Rifles (q.v.) and the Royal W. African Frontier Force. They served as officers and N.C.Os. in these forces, and saw action in the E. African, Madagascar, and Burma campaigns. More than 1000 S. Rhodesians served in artillery units, forming first the S. R. Light Battery, and later the S. R. Anti-Tank Battery, and in these and other units they saw service in N. Africa, Sicily, and Italy.

See P. H. Hone, *Southern Rhodesia*, 1909; H. M. Hole, *The Making of Rhodesia*, 1926; A. Macmillan (ed.), *Rhodesia and Eastern Africa*, 1931; T. G. Standing, *The Story of Rhodesia*, 1936; R. Moffat, *Matabele Journals*, 1943; G. S. and E. Moffat, *Matabele Mission*, 1945; and Bishop Knight-Brace's diary, *Gold and the Gospel in Mashonaland*, 1888 (ed. by Constance E. Fripp and V. W. Hüller), 1949. See also *Annual Departmental Reports of the Government of Southern*

Rhodesia; Annual Year Book and Guide of the Rhodesias and Nyasaland; Official Year Book of the South Rhodesian Government.

Rhodium (symbol Rh, atomic number 45, atomic weight 102.9), metal of the platinum group, in whose ores it is found. It was discovered by Wollaston in 1803, and is a very hard white metal, ductile and malleable (sp. gr. 12.1; melting-point 1907° C.). It is insoluble in acids, but alloyed with platinum and some other metals it dissolves in *aqua regia*. Its name is derived from the red colour of its salt solutions, which are prepared from Rh_2O_3 . Three oxides, a chloride, and two sulphides have been isolated. It is used, alloyed with platinum, for thermoelectric functions of some pyrometers, and electro-deposited R. has a high reflective power.

Rhododendron (Gk. *ῥόδον*, rose; *δένδρον*, tree), genus of evergreen and deciduous shrubs or low trees (family Ericaceae) with leathery leaves and racemose corymbs of fragrant flowers, which are of a great variety of delicate tints, and are borne in late spring. A large proportion are hardy, thriving best in a deep fibrous sandy peat. The presence of lime in soils is always harmful to Rs. A mulch of decayed manure is desirable in May, and the seed-pods should be removed as the flowers fade. Rs. are increased from cuttings, by grafting in March, and by layering in Sept. The R. is allied to the *Azalea*, and the cultural requirements of these two genera are similar. The earliest record of the cultivation of Rs. in Britain is 1629, and they became popular after the discoveries made in the E. Himalayas by Sir Joseph Hooker in the mid-nineteenth century. The genus evolved in the N. hemisphere, but its place of origin is uncertain.

Rhodope, prov. of Greece in W. Thrace on the E. foothills of the R. Mts. The cap. is Komotini. Area 155 sq. m. Pop. 201,800.

Rhodope Mountains (called by the Turks *Dospad Dag* and by the Bulgarians *Despoto Dag*), mt. chain dividing Macedonia and Thrace, and so called from its numerous Gk. monasteries. The chief peaks are *Muse Alla* (9015 ft.) and *Rila Dag* (8790 ft.).

Rhondda, David Alfred Thomas (1856-1918), Brit. merchant and politician, b. at Aberdare, Glamorganshire. Became head of the Cambrian combine and other S. Welsh colliery companies. Elected Liberal M.P. for Merthyr, 1888-1910, and for Cardiff, 1910. President of the Local Gov. Board, 1916-17, and food controller in 1917. Raised to the peerage 1916; viscount, 1918. His title passed to his daughter, Margaret Haig (b. 1883), who occupied some of his positions, and became known as an advocate of women's rights.

Rhondda, Margaret Haig, second Viscountess of Llanwrne (b. 1883), Brit. feminist and editor, b. in London, and educated at St. Leonard's School and Somerville College, Oxford. She founded and became editor of the non-party weekly review *Time and Tide* (q.v.). Lady R. was a leading figure in the campaign

for women's rights. She succeeded to her father's peerage in 1918 by special remainder. Her publs. include *Leisured Women* (1928); *This was My World* (autobiographical, 1933); and *Notes on the Way* (1937).

Rhondda: 1. Urb. dist. of Glamorganshire, on the S. Wales coalfield, 16 m. from Cardiff. The chief industry is coal-mining, but there is also a variety of manufs. such as electrical accessories, light engineering, etc. It sends two members to Parliament. Pop. 112,000. 2. Riv. of S. Wales, joining the r. b. of the Taff near Pontypridd. Its valley is an important coal-mining area.

Rhône, dept. of E. France, with an area of 1104 sq. m., drained by the Rhone (a boundary eastward) and its affluents, the Saône, Azergues, and Gier. There are two arrons., Lyons (cap.) and Villefranches. The chief highlands are the Beaujolais (St. Rigaud, 3320 ft.), Tarare, and Lyonnais Mts. Moderate crops of wheat and rye, etc., grow on the rocky soil, and the vine is cultivated in the S. Mulberry-trees are grown to feed the silkworms, silk-weaving being the chief industry. There is some metal and coal-mining. Pop. 918,900.

Rhône (Lat. Rhodanus), great riv. of Europe (505 m. long), with a drainage area of 38,000 sq. m. The valley is highly cultivated; vegetables, vines, and mulberry-trees and olives in the S. are grown. Rising at an elevation of close on 6000 ft. from the R. Glacier (q.v.) in the Swiss canton of the Valais, it is a turbulent mt. torrent until it reaches Brieg. At Martigny it changes its course from S.W. to N.W., and finally reaches Geneva, after traversing the whole length of the lake (45 m.), from Villeneuve, the E. extremity. So far the riv. has fallen 4679 ft. (in 106 m.); from Geneva to Lyons (124 m.) the fall is only 689 ft. This second section is marked by numerous narrow gorges as the waters wind about the S. spurs of the Jura Mts. Above Lyons the chief trib. is the Ain, whilst just below is the confluence with the Saône, through which there is a communication with the Rhine, Moselle, Seine, and Loire. The third section (southward from Lyons to the Mediterranean, near Marseilles), with its tribs. the Isère, Drôme, and Durance (on the left), and the Ardèche (on the right), drains valleys where flourished famous centres of Gk. and Rom. culture. Here along the r. b. stand to-day the cities of Vienne and Avignon, Tarascon and Arles. The R. is navigable as far as Lyons. The Genesiat dam on the Upper R. was completed in 1948, the first of a project for twenty-one dams for hydro-electric power. In 1944 the Amer. Seventh Army under Gens. Devers and Patch advanced rapidly up the R. valley, routing the Gers, and eventually joined hands with the Third Army near the Ger. frontier.

Rhone Glacier, lies 10 m. from Münster and 31 m. from Brieg, in Switzerland. It is the source of the Rhone, and ascends with magnificent ice terraces for 6 m. between the Galenstock, Rhonestock, and

Damastock to the E., and the Gerstenhörn and Gelmehörn to the W.

Rhubarb (*Rheum hybridum* or *rhaponticum*), perennial herbaceous plant (family Polygonaceae) is cultivated for its edible leaf stalks, which are utilised as a spring fruit. It will grow in most kinds of soil that have been deeply dug and manured, but is most productive in a rich deep loam which is cool, moist, and well drained. It can be raised from seeds, but stalks should not be gathered until the stools are three years old. It is more commonly propagated by div. of the roots. It is easily forced by covering the 'stools' with inverted tubs, surrounded with litter, or by planting the roots in heat. The R. of pharmacy is derived from *R. palmatum*, and is prepared as an extract, infusion, tincture, or pill.

Rhuddlan, or **Rhyddlan**, tn. of Flintshire, Wales, 3 m. S. of Rhyl. The ruined castle was an eleventh-century structure. R.'s prosperity as a seaport was destroyed by the encroachment of sand. Pop. 1500.

Rhussen, see **SEICHE**.

Rhyl, seaside resort, 30 m. by rail N.W. of Chester, near the mouth of the Clwyd, in Flintshire, N. Wales. Pop. 18,500.

Rhyme. Johnson derives this word from the Gk. *rhythmus* (*poësis*). Others derive it from the Swedish and Dan. *ryn*, the Dutch *ryn*, and the Ger. *Reim*. All the prin. European nations use the same word to signify the same thing. Thus, the Fr. have *rim*, the It. *rima*, and the Spaniards *rima*. The Gk. and Rom. poets did not use R. and the word *rhythmus* was applied by both, in its poetical meaning, to the metrical arrangement of syllables, and not to the correspondence of sound in their terminations. R. was not used either by the Celtic or by the early Scandinavian nations. R., as an accompaniment of verse, cannot be traced further back among European nations than to the *rymours* of Normandy, the troubadours of Provence, the minnesingers of Germany, and the monks, who, after the fall of the Rom. Empire, added rhyming terminations to the Lat. metres which were chanted or sung in the church service. It was early employed by the It. poets. The *Divina Commedia* of Dante, the oldest of the great It. poems, is in alternate It. The early A.-S. poetry is without R., but it is sometimes used in the latter. Many of the Middle Eng. poems have It.

Rhyme Song (or **Riming Poem**), A.-S. poem of eighty-seven lines, preserved in the Exeter Book, notable for its metrical form, which is probably imitated from the *Hofuthlausn* of Egil Skallagrimsson, composed in Northumberland at the court of Athelstan. It exhibits a complicated system of internal consonance, frequently repeated, at the ends of lines and half lines. Alliteration is also used. It is evidently rather a metrical exercise than a poem, and has been attributed to Cynewulf, the subject recalling the epilogue to *Elene*, but the resemblance is not very striking.

Rhymney: 1. Tn. of Monmouthshire, England, 2½ m. W. of Tredegar, is the

centre of a coal-mining dist., and has iron-works and a clothing factory. Pop. 9300. 2. **Rumney**, riv. forming the boundary between Monmouthshire and Glamorganshire, Wales, and flowing S. into the Bristol Channel, 2 m. E. of Cardiff. Length 30 m.

Rhynchops, see **SKIMMER**.

Rhyncophora, see **WFLVILIS**.

Rhyndaeus, see **LASCARIS**, **ANDREAS** **JOHANNES**.

Rhyolite, general term for a group of volcanic rocks characterised by acid composition, an unusually large proportion of silica, and, in many cases, a vitreous structure. Its. are often called *liparites*, from their frequent occurrence in the lavas of the Lipari Is.

Rhys Davids, see **DAVIDS**, **THOMAS** **WILLIAM** **RHYS**.

Rhys, **Ernest** (1859-1916), editor of *Everyman's Library* (qv), b. in London. Educated at Carmarthen, Newcastle-on-Tyne, and Durham, he began his career



ERNEST RHYS

as a mining engineer, but abandoned it for literature. From 1886 onwards he ed the *Camelot* series. He wrote poetry, novels, and lyrical drama. The title of *Everyman's Library* was suggested by R. to J. M. Dent, and the series was planned from the first to reach a total of 1000 vols. Beginning with *Boswell's Life of Johnson*, R. and Dent produced no fewer than 100 vols. in the first year. Besides his work as publisher's editor, he ed also *Modern English Essays* (1922); *Everyman Remembers* (1931); and *Letters from Lambo* (1938). His stories include *The Man at Odds* (1905) and *White Horse Pat* (1925). See R.'s reminiscences, *Everyman*

Remembers (1931) and *Wales England Wed* (1940).

Rhys, Sir John (1840-1915), Brit. Celtic scholar and educationist, *b.* in Cardigan-shire, Wales, son of a yeoman farmer. He was educated at the Brit. school of Penllwyn, near Aberystwyth, and at Bangor Normal College. He matriculated at Leipzig, and then devoted himself to linguistic research. His *Lectures on Welsh Philology* (1877) estab. his reputation as a Celtic scholar, and when the Jesus College professorship of Celtic was founded in 1877 he was elected the first prof. He was principal of the college from 1895 to 1915. His other philological works include *Outlines of the Phonology of Manx Gaelic* (1894) and various monographs on Celtic inscriptions. His historical works include *Celtic Britain* (1879); 'Studies in Early Irish History' (pub. in the *Proceedings of the British Academy*, 1903); and *The Welsh People* (with D. Brynmor-Jones, 1900).

Rhythm (Gk. *ῥυθμός*, flow), regular and measured beat or movement in language, music, or action. Both verse and prose may be rhythmical, but the R. of the former is more regular and obvious, and in Eng. prosody is marked by stress or accent. True poetical R. is modified by the emotion it conveys, and is never mechanical or lifeless, while its nature varies with the subject of the verse. R. in verse is marked by feet, analogous to bars in music, and the 'time' of these is indicated by various distinctive names, trochaic, dactylic, etc., which may be studied in any work of prosody.

Rhynchostelleri, see *SEA-COW*, NORTHERN.

Riazan, or Ryzan: 1. Region of the R.S.F.S.R., to the S.E. of Moscow; it exports corn, and has also coalfields and limestone quarries, etc. Area, 16,190 sq. m. Pop. 2,500,000. 2. Cap. of the above region, on the Trubozh, near its confluence with the Oka, 120 m. by rail S.E. of Moscow. There is an Orthodox Gk. cathedral. The tn. is a railway centre, and produces machinery, alcohol, and footwear. Pop. 93,400.

Ribbentrop, Joachim von (1899-1946), Ger. politician and diplomat, *b.* at Wesel. After serving in the First World War he became a sales agent in wines and married the daughter of Henckell, proprietor of a champagne firm of Cologne. He joined the National Socialist party in 1932, becoming Hitler's plenipotentiary for foreign affairs while Baron von Neurath was still foreign minister. He was appointed Ger. ambas. in London, where later his intense unpopularity merely provoked hostile demonstrations in Downing Street (1936-37). In 1937 R. replaced von Neurath, the substitution being indicative of the beginning of Hitler's expansionist undertakings, and signed the Ger.-Soviet Pact of Aug. 23, 1939. He assured Hitler before the outbreak of the Second World War that Great Britain would not fight. He was tried at Nuremberg (Nov. 1945-Oct. 1946) and sentenced to death. For a character sketch of R. see Sumner Welles, *Time for Decision*, 1947.

Ribble, riv. of Engand, 75 m. long, rises in the Pennine Chain, W. Yorkshire, and flowing S.S.E. and S.W. through Lancashire, passes Preston, and enters the Irish Sea at Southport.

Ribbon, Riband, or Ribband, silk with a narrow web, varying from fractions of an inch to a foot in width, used for tying, binding, and all kinds of trimmings. A modern power loom can weave as many as forty Rs. at a time; in Jacquard looms, which turn out patterned fabrics, every warp thread is under mechanical control so that the weft or 'shute' may be made to catch it up or not according to the design. The chief centres of manuf. are St. Etienne (France), Basle (Switzerland), Coventry (England), Krefeld (Germany), Paterson (New Jersey), and Moscow (Russia).

Ribbon Development, building along the sides of new arterial roads regardless of amenities or safety, or making new means of access to such roads, so as thereby to impair the effectiveness of such roads as arterial through-roads for motor traffic. The Ribbon Development Act, 1935, directed towards preserving the amenities of roads by checking 'ribbon' building development and securing greater road safety, empowered local authorities to 'sterilise' areas by the sides of roads, their width varying with local conditions, so that it was thereafter unlawful, without the consent of the local authority, to build along or to make new means of access to such roads. For all practical purposes highway authorities (co., bor., and urb. dist. councils) were given power to refuse to allow development within 220 ft. of the middle of roads classified in 1935 or otherwise brought under the Act. The Town and Country Planning Act, 1936, permits the purchase of land on either side of arterial roads to prevent R. D. But it does not compel the power to be used, and R. D. with a few exceptions continued in spite of both these Acts. Further difficulties were created by the need for factories for war purposes, with the result that the Restriction of Ribbon Development Temporary Development Act was passed in 1943, allowing local authorities to give a temporary consent if required in the interests of war production.

Ribbon-fish, term applied to any species of the family Trachypteridae. They are pelagic fishes, with elongated and compressed bodies which have a ribbon-like appearance. There is no anal fin, but the dorsal fin is as long as the body, and the ventral fins have from one long ray to nine smaller ones. They are seldom found alive, and are usually seen floating dead on the surface of the ocean. *Trachyp-terus arcticus*, the N. R. or deal-fish, occurs near Scandinavia. R. may have been mistaken on various occasions for marine 'monsters.'

Ribbonism, see under WHITEBOYS, and as to tenant-right, under LAND LAWS.

Ribbon Microphone, see under MICROPHONE.

Ribchester, vil. in Lancashire, England, on the Ribble, 5 m. from Blackburn.

Remains have been found of a Roman station called Brenntonacum. There is a museum containing many valuable Roman remains. Pop. 1600.

Ribeauvillé, or Rappoltswiller, tn. in the dept. of Haut-Rhin, France, 8 m. N.N.W. of Colmar. It is walled, and known as the 'Pipers' tn.'; there are three famous castles near by, Girsberg, Hohrappoltstein, and Ulrichsburg. The prin. industries are spinning, weaving, dyeing, printing, tanning, etc., and there is an extensive wine trade. Pop. 5000.

Ribeira, or Riviera, seaport in the prov. and 67 m. S.S.W. of Corunna, Spain. Pop. 14,000.

Ribeirao Preto, tn. of Brazil in São Paulo State, 260 m. by rail from São Paulo city. It is a distributing centre for the state and for Minas Geraes and Matto Grosso and produces coffee, cotton, sugar, and rice. Pop. 90,800.

Ribot, Alexandre Félix Joseph (1842-1923), Fr. statesman, b. at St. Omer, studied at the univ. of Paris and adopted the legal profession. He succeeded Loubet as Prime Minister, 1892-93, and headed a short lived ministry, 1895. In 1909 he left the Chamber of Deputies for the Senate, in 1913 was a candidate for the presidency of the Republic, and became Prime Minister in the spring of 1914. He was minister of finance in Viviani's second Cabinet, 1914-15, and under Briand till March 1917, when he became Prime Minister for the last time. See his letters (Eng. trans., 1925).

Ribs, arched bones which form the wall of the thorax. In the human subject they are twenty-four in number. The upper seven on each side are termed *true* or *vertebro-sternal*, as they articulate with the thoracic vertebrae and are joined to the sternum or breast-bone by cartilages; the next three on each side are called *false* or *vertebro-costal*, as their anterior extremities are joined to each other, not to the sternum; the two lowest are known as *floating* or *vertebral*, as their anterior extremities are free. The ribs, together with the sternum and backbone, form a bony framework, appropriately known in Ger. as the *Brustkorb*, or 'basket,' of the chest, protecting the organs of the thoracic cavity, and are capable by their arched form of resisting considerable pressure. If any ribs are fractured, the whole part should be rendered immovable by a broad and tight roller bandage. The R. and diaphragm are responsible for the respiratory movements which fill the lungs (see BREATHING).

Ricard, Louis Gustave (1823-72), Fr. painter, b. at Marseilles. He studied art in Marseilles and from 1844 at Paris. He first exhibited in the Salon of that year with his portrait of Mme de Sabatier, a sensational picture of the time. It is on the realism and skill of his portraits that his fame chiefly rests.

Ricardo, David (1772-1823), Eng. political economist, b. in London, son of a Dutch Jew, educated in Holland, and then joined his father on the Stock Exchange. R. devoted much spare time to study and scientific pursuits, and was one

of the original promoters of the Geological Society of London. Later in life he wrote on political economy from a mercantile standpoint, particularly on currency and taxation, and was the first to enunciate clearly the quantity theory of money. But he is chiefly remembered for his theory of rent, as to which, see under ECONOMICS. R. first appeared as an author during the discussions that led to the famous Bullion Committee in 1810, and his pamphlet *The High Price of Bullion* passed through four eds. R.'s next pub. was *A Reply to Mr. Bosanquet's Practical Observations on the Report of the Bullion Committee* (1811), which was followed by *An Essay on the Influence of a Low Price of Corn on the Profits of Stock* (1815). His great work, *On the Principles of Political Economy and Taxation*, appeared in 1817, and was pronounced the most valuable contribution made to economic science since the days of Adam Smith. R. was M.P. for Portarlington (1819-23). His collected works were ed. by J. R. McCulloch in 1846. See life by J. H. Hollander, 1910.

Ricasoli, Bettino, Baron (1809-80), It. statesman, b. at Florence, tried, as Gonfaloniere of Florence (1848), to thwart the reactionary policy of the grand duke of Tuscany. Having assisted in the union of Tuscany with Piedmont (1860), he accepted, on Cavour's death (1861), the premiership, recalled Mazzini, and on his reaccession to office (1866) made conciliatory but ineffectual overtures to the Vatican. See M. Niels, *Helsu*, 1943.

Ricci, or Rizzi, Sebastiano (1659-1734), It. painter, b. at Belluno, in the Venetian ter. He was invited to the court of Vienna, to decorate the palace of Schönbrunn, whence he went, at the invitation of the duke of Tuscany, to Florence, and afterwards visited England, where he remained ten years. See study by J. von Derschau, 1922.

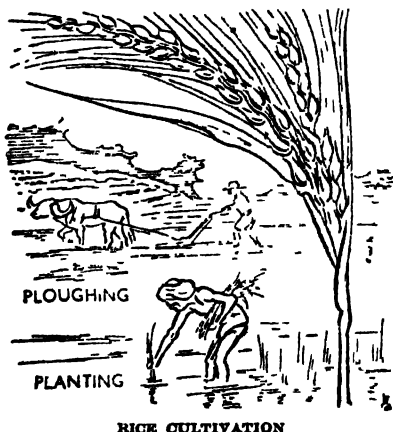
Riccio, called Brusasorci, Domenico (1494-1567), It. historical painter, b. at Verona, was a disciple of Giovanni Francesco Caroto; he also went to Venice to study Giorgione and Titian. Cardinal Gonzaga invited him to Mantua, where he painted in competition with Paolo Veronese and Farinato.

Riccio, Andrea (1470-1532), It. engraver and goldsmith, b. at Padua. He was influenced by Mantegna and the ideas of Venetian renaissance artists. His statuettes, both in idea and skill of execution, had a beauty not seen since the classical age. See study by L. Planiscig, 1927.

Riccio, or Rizzio, David (1533-66), son of an It. musician, b. at Pincallieri. Coming in 1561 to Scotland in the train of the ambas. of the duke of Savoy, he became known to Mary Queen of Scots, who in 1564 appointed him her Fr. secretary. He soon acquired great influence with Mary and to some degree directed her policy, which greatly angered her husband Darnley and the nobles. On suspicion of being the queen's lover, he was seized in her presence, and killed in an adjacent room.

Riccioli, Giovanni Battista (1598-1671), Ferrarese philosopher and mathematician. A member of the Society of Jesus, he lectured on philosophy and rhetoric in the univs. of Bologna and Parma. It is, however, upon his proficiency in astronomy that his reputation principally rests, on which subject he pub. some valuable works, viz. *Astronomia Reformata*; *Chronologia Reformata*; and the *New Almagest*; besides twelve books on geography, printed in 1672.

Rice, Elmer (b. 1892), Amer. playwright and novelist, b. in New York, his real name being Elmer Reizenstein. He graduated from New York Law School, and became a solicitor's clerk, but quickly abandoned this for writing. In 1914 his first play, *On Trial*, was produced. This was remarkable for his use of 'flash-backs' to portray episodes described by the witnesses in the play, a technique more common to the cinema than to the stage. After the First World War he became a leading supporter of Expressionism, and his second great success, *The Adding Machine* (1923), was a satirical fantasy embodying expressionist ideas. He showed a deep interest in the problems of ordinary Amer. society, and *Street Scene* won him the Pulitzer prize in 1929. In *Judgment Day* (1934) he dealt with the issues raised by the Reichstag fire trials, and it is on this compelling, thoughtful drama that his European reputation rests. A master of dramatic technique, R. is able, with a few characters, in an apparently slight and narrow setting, to raise problems of universal importance and urgency. He has also written a number of novels, including *Imperial City* (1937), a realistic study of life in New York. In 1945 R. was made president of the Authors' League of America.



RICE CULTIVATION

Rice (*Oryza sativa*), marsh plant (family Gramineae), cultivated in nearly all hot countries where capable of artificial irrigation. The grain is rich in starch, and

probably supports a greater number of human beings than any other cereal. It is the removal by 'polishing' or milling of the cortical and sub-cortical layer, the cells of which contain aleurone and vitamin B, that causes beri-beri (g.v.) amongst those with whom R. is a staple diet. R. in the husk is known as 'paddy' or 'padi.' The granules of R. starch are angular and minute. It is grown throughout the Far E., Egypt and other Mediterranean countries, Brazil, the U.S.A., and in some W. Indian is.

Rice Bird, Paddy Bird, or Java Sparrow (*Munus oryzivora*), weaver bird, which is one of the worst avian enemies of the rice cultivator. It is more commonly kept as a pet than any other foreign bird. See also BOBOLINK.

Rice-paper is made from the pith of *Aralia papyrifera*, a tree which grows in the is. of Formosa. The paper is much used in China and Japan for brightly coloured pictures and designs. It is also employed in making artificial flowers. A paper has been prepared by the Jap. from rice straw.

Rich, Claudius James (1787-1820), Eng. orientalist and traveller, b. at Dijon and educated at Bristol. His proficiency in the E. languages was so great that he was made a writer to the E. India Company at the age of seventeen, and finally became their resident at Bagdad. He displayed his great literary talents in two memoirs on the ruins of Babylon and on the site of anc. Nineveh, and his valuable collection of about 900 vols. of oriental MSS., together with a large number of Gk. and oriental coins and gems and antiquities from Babylon, was purchased by the trustees of the Brit. Museum. See S. Lloyd, *Foundations in the Dust*, 1947.

Rich, Edmund, see EDMUND (RICH), SR.
Rich, John (1692-1761), Eng. actor, noted for his development of pantomime at Covent Garden in the eighteenth century. At Lincoln's Inn Fields (1723) he produced *The Necromancer, or History of Dr. Faustus* as a rival pantomime to John Thurmond's *Harlequin Dr. Faustus* at Drury Lane. Taking his inspiration for Eng. pantomime from the Fr. and It. harlequins and scaramouches he used a serious legendary story told operatically by dance and song.

Richard I., called **Richard Cour-de-Lion** (1157-99), king of England, was the third son of Henry II. and Eleanor of Poitou. He became duke of Aquitaine in 1170, and succeeded to the Eng. throne in 1189, and at once prepared to join the third crusade. He reached Acre in June 1191, and within a month forced it to surrender, and shortly after took possession of Ascalon. He defeated Saladin near Arsuf in that year, and in the following year defeated him again at Jaffa. His brother John having usurped his authority at home, he was compelled to conclude a truce, and hastened to Europe. Travelling in disguise through Europe, he was captured near Vienna by the duke of Austria, who handed him over to the Emperor Henry VI. He had to pay a ransom of 150,000 marks for his freedom, which

he obtained in March 1194. The return of Richard settled the fate of John's insurrection, but owing to the alliance between John and Philip Augustus, king of France, he was unable to return to the E., as had been his intention. He went to Normandy in May 1194, defeated Philip, and two years later made peace with him. He was mortally wounded in besieging the castle of Chalus. During R.'s reign important constitutional, financial, and legal developments occurred. His long absences made necessary baronial co-operation to carry on the administration of the kingdom; offices were sold and constant scutages levied in an effort to meet R.'s financial demands; the coroner became an essential figure in the operation of Eng. law. The accounts of the chroniclers point to R. as the most popular of all medieval Eng. kings; it seems clear that he was personally brave, probably devout, and appealed to the imagination of the London mob. But his relations with the king of France illustrate his lack of diplomacy; and it may be suggested that he laid the foundations for the baronial revolt of 1214. During his reign financial exactions became unprecedently heavy; his policy left an empty exchequer and marked the beginning of the Angevin expulsion from France; while his absence showed the baronial party how to unite to support an absent monarch, a process they were later to adopt to coerce a recalcitrant one. See W. E. Aytoun, *Life and Times of Richard I.*, 1840; J. H. Ramsay, *The Angevin Empire*, 1903; R. L. Poole, *The Exchequer in the Twelfth Century*, 1912; Kate Norgate, *Richard the Lion Heart*, 1924; and C. Wilkinson, *Richard Cœur-de-Lion*, 1933.

Richard II. (1367-1400), king of England, was the younger son of Edward, Prince of Wales ('the Black Prince'), and succeeded Edward III. in June 1377. During his minority there was a struggle for the control of affairs, and in 1381 the Wat Tyler insurrection broke out. He married (1382) Anne, sister of Wenceslaus, king of Bohemia, and in that year, attaining his majority, attempted to wrest the government of the country from John, duke of Lancaster. He appointed Michael de la Pole, whom he created duke of Suffolk, as chancellor, and, though he sent Lancaster on a mission to Spain, he had to contend against the nobles, who resented the appointment. The struggle was continuous until 1397, when the earl of Arundel and the duke of Gloucester were condemned to death. A rising in 1399, under Henry of Lancaster, duke of Hereford, was unsuccessful, and R. surrendered and was imprisoned at Pontefract, where he died on Feb. 14, 1400. His first consort, Anne of Bohemia, died in 1394, and two years later he married Isabella, daughter of Charles VI. of France. R.'s position was from the start difficult; he succeeded to a kingdom weakened by expensive wars and disheartened by recent defeats, disorganised by the Black Death, in the midst of a period of social transition, and suffering from the emergence of the 'over-mighty subject,' the

result of Edward III.'s cessions to his many sons. R. became unpopular because of developments arising from his predecessor's policy, and for actions taken in his name by others during his long minority; an unhappy childhood may have been responsible for his unbalanced character. His reign was a conflict in which R. appears as struggling for the trappings of power even more than for the sake of the power itself; he has been called the last of the medieval Eng. kings to rule by virtue of divine right; his defeat marks the end of a theory for 200 years. His actions, especially in his last years, suggest a progress from chronic instability to something closely allied to insanity. He failed to keep his throne, not because of his arbitrariness, but because he lacked the political sense of Henry Bolingbroke, and was increasingly governed by emotion. See C. Oman, *The Great Revolt of 1381*, 1896, and life by A. Steel, 1941.

Richard III. (1452-85), king of England, was the eleventh child of Richard, third duke of York. He was a brave man and an able soldier, and was present at Barnet and Tewkesbury; but he early acquired an evil reputation, and it was rumoured that he instigated the murders of Edward, Prince of Wales, and Henry VI. On the death of Edward IV. (1483) he was appointed regent during the minority, but there was much intriguing against him, and sev. attempts to deprive him of his power. Parliament offered him the crown in 1483, and by his acceptance he alienated many of those who had formerly supported him. When the news of the death of the princes in the Tower became known, public feeling was strong against him. Henry, earl of Richmond, the representative of the Lancastrian line, invaded England in 1485, and on the field of Bosworth Richard was defeated and slain. His character is still debated by historians, and much research remains to be done on the events of his reign, at present one of the most obscure in fifteenth-century hist. The chroniclers' accounts are disjointed and conflicting, and passages may well have been suppressed by later monarchs. The suspicious circumstances of his accession dogged him; personally intelligent and brave, R. appears to have been gradually overwhelmed by his own ambitions. Though admirably suited to the position of regent, he failed to grasp that an attempt by so partisan a personage to win the crown could never succeed without more powerful support than he could command. See J. Ramsay, *Lancaster and York*, 1892, and life by Sir C. R. Markham, 1906.

Richard de Bury, see AUNGERVILLE, RICH.

Richard of Cirencester (c. 1335-c. 1401), Eng. historian, was a native of Cirencester, Gloucestershire. In 1350 he joined the Benedictine Abbey of St. Peter, Westminster. The MS. of his unreliable compilation, entitled *Speculum Historiale de Gestis Regum Anglorum, 447-1066*, rests in the Cambridge Univ. library.

Richard of Cornwall (1209-72), second

son of John, king of England, assisted William of Salisbury in the recovery of Gascony (1226). The following year Henry III. was compelled by his barons to settle Cornwall on his brother. In 1257 Richard was crowned titular king of the Romans. He was at one point the leader of baronial opposition to Henry III.; but during the De Montfort rising he supported Henry, and suffered a year's captivity (1264). See life by N. Denham-Young, 1947; also Sir F. M. Powicke, *Henry III. and the Lord Edward*, 1947.

Richardia, or *Zantedeschia*, more commonly known as the arum lily, genus of S. African plants (family Araceae) with white, yellow, or rose-coloured spathes and decorative arrow-shaped leaves. The best-known species is *R. africana* (*æthiopica*), from which sev. varieties have been derived. It is usual to set out the plants in rich moist soil in early summer, lifting and repotting early in Sept., when they can be divided. While flowering a stimulant is desirable.

Richards, Gordon (b. 1904), Brit. jockey, b. at Oakengates, Shropshire. His father was a miner, and R. learned to ride pinnies. He was apprenticed to Hartigan, the trainer, and first raced in 1920, becoming champion jockey five years later, a position he held for more than twenty years, with only short intervals in 1926, 1930, and 1941. In 1947 he broke all records by riding 269 winners. He had already in 1943 beaten Archer's (q.v.) record, by winning his 2750th race at Windsor.

Richards, Theodore William (1868-1928), Amer. physicist, b. at Germantown, Pennsylvania, became prof. at Harvard. His work on the revision of the atomic weights of the elements won him the Nobel prize in 1914. He also made researches into the structure of the atom.

Richardson, Henry Handel (Mrs. J. G. Robertson) (c. 1875-1946), Australian novelist, b. in Melbourne. She went to school in Melbourne, at eighteen studied music and Ger. at Leipzig, and did not return to Australia. Leipzig supplies the background for her first novel, *Maurice Guest* (1908), a book of rare imaginative power not unworthy of Flaubert or even Tolstoy. In 1910 appeared a story of school life entitled *The Gelling of Wisdom*, a book, curiously enough, showing far less maturity than her first. But with the pub. in 1917 of *Australia Felix*, the first vol. of her Australian trilogy *The Fortunes of Richard Mahony*, she had launched out on her best work. The background of this vol. is Ballarat in the gold rush and its keynote is frustration and cultural barrenness. The second vol., *The Way Home* (1925), reflects the contrast between 'colonial intelligence' and Eng. social civilisation, and the concluding vol., *Ultima Thule* (1929), shows the frustrated Mahony gripped by insanity. Other books are *The End of a Childhood* and *other Stories* (1934) and *The Young Cosima* (1939) in which Wagner and Liszt are interpreted with brilliant insight, though the dominant figure is Cosima herself.

Intensity and seriousness are the main features of her work, and in the opinion of many she is to be remembered as the most remarkable novelist Australia has produced.

Richardson, Sir Owen Willans (b. 1879), Eng. physicist, b. at Dowsbury, was educated at Batley Grammar School and Trinity College, Cambridge. He was prof. at Princeton, U.S.A., at King's Colleges, London and Yarrow, prof. of the Royal College. He has written books on the emission of electricity from hot bodies and the electron theory of matter and on molecular and hydrogen and its spectrum. R. won the Nobel prize for physics in 1928, and was knighted in 1939.

Richardson, Sir Ralph David (b. 1902), Brit. actor, b. at Cheltenham and educated at the Xaverian College, Brighton. His first stage appearance, as Lorenzo in *The Merchant of Venice*, was in Brighton in 1921. In 1926 he appeared in *Yellow Sands* at the Haymarket Theatre, London. He estab. a reputation as a great Shakespearian actor at the Malvern festivals, with the Old Vic, and in New York. He entered films in 1933 and gave outstanding performances in *South Riding*, *The Citadel*, and *The Silver Fleet*. In 1944 R. rejoined the Old Vic as joint director. Since the Second World War he has played in *Peer Gynt*, *The Alchemist*, *Cyrano*, and *Uncle Vanya*. His most notable Shakespearian part has been his superb rendering of Falstaff in *Henry IV*. R. was knighted in 1947.

Richardson, Samuel (1689-1761), Eng. novelist, b. in Derbyshire, but came to London and, after serving an apprenticeship to a printer, set up in business in 1719 on his own account. For twenty years he pursued this calling, and then two booksellers, Rivington and Osborne, suggested that he should write a vol. after the style of 'The Police Letter-writer.' The idea appealed to R., but he improved upon it, and wrote the story in letters known as *Pamela; or, Virtue Rewarded* (1740). This was a great success, and not even Fielding's parody, *Joseph Andrews*, could stop its triumphal march. His next work was *Clarissa* (1748), and this was followed by *The History of Sir Charles Grandison* (1753). His books are little read now, owing to his sentimentality and narrow outlook on life, but R., who has been called 'the father of the modern novel,' must always occupy an important place in the hist. of Eng. literature. His correspondence, prefaced by a biographical account by A. L. Barbauld, was pub. in 1804. See lives and studies by C. L. Thomson, 1900; A. Dobson, 1902; H. W. Downs, 1928; P. Dutton, 1931; and A. D. McKillop, 1936.

Richborough, tn. of Kent, England, near Sandwich on the S.E. coast. R. lies on the R. Stour, and is the site of a military port and harbour which was famous in both world wars for the train ferry which it maintained with France. In the Second World War it was an embarkation port for the invasion of Normandy and for many other missions, and here units of Pluto (see FIRE-LINES) and

'Mulberry' harbour were made. R. is well known for the extensive remains of a Rom. fortress and station (Rutupiæ), which is often mentioned by the Lat. authors, chiefly as a port of arrival in Britain, and in particular by Juvenal for its oysters. The site has been scientifically excavated and is one of the show-places of Rom. Britain. Its real importance began with the invasion of Claudius in A.D. 43, and the defensive ditches of the base camp have been located, as have the granaries and other wooden buildings of the supply depot which followed the Claudian camp. About A.D. 85 the camp area was cleared for the erection of a magnificent marble-cased building furnished with bronze statues, probably to mark the final conquest of Britain by the Emperor Domitian; the great cruciform foundation of it still exists. There was intensive occupation in the second century, while in the second half of the third century an earthwork fort with triple ditches was built to protect the coast from sea raiders; the ditches as excavated may still be seen. The most prominent feature of the site is the great stone walls and ditches of the Fort of the Saxon Shore, one of a series built as a defence from the Saxon pirates and sited round the coast of S.E. Britain from the Wash to Portsmouth. It was probably built in the reign of the usurper Maxentius (A.D. 287-93), who set himself up as emperor in Britain. There was still an intensive occupation late in the fourth century, and even in the early fifth century. More than 300 wells and rubbish pits in the area have been completely excavated, and the most interesting of the objects found in these pits and elsewhere on the site are preserved in the museum. See *Society of Antiquaries Research Reports, Richborough I., II., and III., 1926-32.*

Richelieu, Armand Jean du Plessis, Cardinal, Duc de (1585-1642), Fr. statesman, b. in Paris. He was originally intended for the army, but when his elder brother resigned the bishopric of Luçon, in the family preferment, R. was given the benefice. After obtaining a dispensation from Rome, because of his youth, he was consecrated bishop of Luçon in 1607. He soon showed a flair for politics, and possessed in large measure the necessary craft, clear-headedness, and callousness. In 1614 he was a clerical deputy at the States-General. He then became almoner to Anne, wife of Louis XIII., and by gaining the favour of the queen-mother, Marie de' Medici, and her confidants, was made secretary of state. After Concini's murder R. accompanied Marie to Blois, and eventually procured her return and reconciliation with her son. He was rewarded with a cardinal's hat (1622), and by 1624 was chief minister and the supreme power in the country. In 1631 he received a dukedom. Many plots were directed against him: the duke of Orleans waged a constant struggle with R. between 1626 and 1632, and R. broke the conspiracy of Cinq-Mars in the last year of his life. His ability,

patriotism, and resolution are undoubted. Personally frail, and frequently ill, he yet conducted campaigns in person; incapable of inspiring affection, he nevertheless retained the confidence of the king from the time of his accession to power until his death, in spite of the ceaseless antagonism of the court. His courage and competence, coupled with a highly efficient system of espionage, made him proof against all intrigues and assured his successive triumphs.

During the period of his power he kept constantly before him the ideal of a state in which the power of the Crown would be absolute, and which should be supreme and unassailable in Europe, and he did much towards its realisation. When he



RICHELIEU

Engraving after the portrait by Philippe de Champagne.

took office the royal power was limited in two directions. The Huguenots still enjoyed a certain amount of dangerous freedom, and the great nobles retained a degree of power and privilege which was incompatible with unfettered monarchical authority. R. devoted all his energies to the subjugation of Huguenots and nobles. At La Rochelle (1629) the Huguenots were crushed as rebels, but were then granted civic privileges and religious toleration. The nobility's power was curbed; fortified castles were destroyed, and local administration placed in the hands of civil servants. The nobles were encouraged to become court parasites. Abroad France was still menaced on every frontier by the power of the Hapsburgs. R. intervened in the Thirty Years war with the skill of the master-intriguer, giving subsidies to the Hapsburgs' opponents, even to the king of Sweden, the champion of Protestantism. He saw the struggle as a war of ter., not of religion, and his efforts ensured that at the peace of Westphalia France gained strengthened frontiers and enhanced prestige. As a

patron of science and literature R. rebuilt and endowed the Sorbonne, and founded the royal printing house at Paris, the botanic garden, and the Fr. academy. Of his writings, his memoirs (ed. by J. Lair and Baron de Courcel, 1907-12) are still of interest.

R.'s place in Fr. hist. can scarcely be exaggerated. He prepared the way for absolute monarchy in France, and he destroyed the Hapsburg menace to Fr. independence. The worthiness, to France, of his ends has made him a national hero; but his means were more questionable. He was extravagant and improvident. In his selection of ministers and captains he looked for subservience rather than for initiative, and it is significant that the most decisive victories of France in the Thirty Years war were won after his death. Under him the checking of natural political developments began, which led eventually to the revolution; but he laid the foundations for the glory of expansion of France under Louis XIV. See lives by G. Hanotaux (new ed., 1933-35); E. C. Price, 1912; K. Vedern (Eng. trans., 1928); H. Belloc, 1930; and C. J. Burckhardt (vol. 1.), 1940.

Richelieu (called also St. John, or Chambly), riv. of Quebec, Canada, navigable below Chambly; rising in Lake Champlain and flowing due N. to the St. Lawrence, which it meets at Sorel on Lake St. Peter.

Richopin, Jean (1849-1926), Fr. poet, dramatist, and novelist, b. in Médéa, Algeria. He studied letters at the École Normale. In 1870 he fought with the *francs-tireurs* of the army of Bourbaki, and this experience is reflected in his early poems. After the war he was an actor, then he went to sea, and afterwards entered journalism. His work is considerable both in quantity and in quality, of prose, verse, and drama. His first poems, *La Chanson des gueux*, appeared in 1876, and cost him a month in prison and a fine; they were followed by *Les Carences* (1877); *Les Blasphèmes* (an atheist Bible, 1884); *La Mer* (description of sailorlife, 1886); and *Mes Paradis* (1894). His most brilliant play is *La Glu* (1881). Others include *Le Filibustier* (1888); *Par le glaive* (1892); *La Martyre* (1897); *Don Quichotte* (1905); these formed part of the repertoire of the Comédie Française, of which he was for a time director. A famous play of his, with music by Xavier Leroux, is *Le Chemineau* (1897). He acted with Sarah Bernhardt in his *Nana Sahib*. Among his novels are *Les Morts bizarres* (1877); *Madame André* (1877); and *Miarka* (1883).

Richet, Charles Robert (1850-1935), Fr. physiologist, b. in Paris and educated there. From 1887 to 1927 he was prof. of physiology at Paris Univ. R. became famous through his discovery of anaphylaxis, and was awarded the Nobel prize in 1913 for his work on this subject. He also studied the treatment of nervous diseases, and his work on serum therapy was of great importance. He collaborated in the writing of a physiological dictionary, and ed. the *Revue scientifique*.

Riehl, Alois (1844-1924), Austrian philosopher, b. at Bozen, a follower of the neo Kantian school. He attempted to limit philosophy to a theory of cognition, and from this arrived at a pure formalism. His chief pub. was *Der philosophische Kritizismus und seine Bedeutung für die positive Wissenschaft* (1876-87, 1924-26). See study by C. Siegel, 1932.

Richmond and Gordon, Charles Henry Gordon-Lennox, sixth Duke of (1818-1903), Eng. soldier and politician, b. in London, and educated at Westminster and Oxford. He served in the Horse Guards till 1844, was aide-de-camp to the duke of Wellington (1842-52) and to Lord Illiff (1852-54). In 1870 he was made leader of the Conservative party in the House of Lords, in 1874 lord president of the council, and in 1885-86, secretary for Scotland.

Richmond and Lennox, Frances Teresa Stewart, Duchess of (1647-1702), mistress of Charles II. Her father was a physician. After being educated in France she came to England as a maid of honour to Catherine of Braganza, and became the king's mistress in 1668. She was a noted beauty, and was the original model for Britannia on Brit. coins.

Richmond, Sir Herbert (1871-1946), Eng. sailor and naval historian. In his naval career he reached eminence on the technical side as a torpedo officer, and later became recognised as a leading authority not only on naval hist. but on naval strategy. As a captain he commanded the famous battleship *Dreadnought*; as rear- and vice-admiral he was commander-in-chief on the E. Indies station. When in 1927 the College of Imperial Defence (q.v.) was formed he was its first commandant. R. was made K.C.B. in 1926 and admiral in 1929. In 1934 he succeeded Dr. Holland Rose as Vere Harmsworth prof. of imperial and naval hist. at Cambridge, and, later, was elected to the mastership of Downing College. His original researches into naval hist. found expression in *The Navy in the War of 1739-48* (1920); *The Navy in India, 1763-83* (1931); and various pamphlets. Pubs. on the modern application of the strategical lessons of hist. include *National Policy and Naval Strength* (1922, 1931); *Economy of Naval Security* (1931); and *Sea Power in the Modern World* (1934); also, chiefly for naval consumption, *Command and Discipline* (1930) and *Naval Training* (1933). His Ford Lectures (1943) at Oxford were pub. in 1946 as *Statesmen and Sea Power*.

Richmond, Sir William Blake (1843-1921), Eng. painter, b. in London, studied at the Royal Academy and in Italy. In his youth he joined the pre-Raphaelite movement. He was Slade prof. of fine art at Oxford, 1878-83, and R.A. in 1895. In 1891 he undertook the decoration of St. Paul's Cathedral in mosaic. Much of his best work is in portraits.

Richmond: 1. Municipal bor. of Surrey, England, and residential suburb of Greater London. R. Hill to the S.E. commands a fair and famous prospect of meadows, uplands, woods, and of the ls. of the winding Thames, on which the tn. stands.

The stately park (2357 ac.) was once the deer forest and pleasure ground of Charles I. A gateway is the one memorial of the royal palace of Sheen, where Edward III. and Elizabeth died, and where Wolsey lived. Henry VII., who renamed the tn. after his earldom, held a splendid tournament here in 1492. Kean, who leased the theatre (estab. in 1719), lies buried in the par. church, as does the poet James Thomson (1700-48), author of *The Seasons*. R. is celebrated for its extensive parks and open spaces. Pop. 41,400. See R. Crisp, *Richmond and its Inhabitants*, 1866; E. B. Chancellor, *History and Antiques of Richmond*, 1894; and H. M. Cundall, *Bygone Richmond*, 1925. 2. Anct. chartered bor. and mrkt. tn., at the foot of Swaledale in the N. Riding of Yorkshire, England; the centre of farming dists. and a garrison tn. serving Catterick Camp near by. Of the castle, founded by Alan Rufus in 1071, there remains the Norman keep, situated on a natural eminence above the Swale. Its historical associations, old churches, Georgian theatre, and large cobbled square give it a unique place among Yorkshire tns. Pop. 7000. See D. Brooks, *The Story of Richmond*, 1946.

Richmond. 1. Cap., largest city, and port of entry of Virginia, U.S.A., 114 m. S.S.W. of Washington, stands on the James R. (130 m. from its mouth), whose falls supply power for the tobacco, iron and steel, lumber, and packing-case industries. In Capitol Square stand the Washington Monument (1858) and a bronze statue to Stonewall Jackson beside the historic Capitol (1785-92). Edgar Allan Poe lived in R. Pop. 193,000. 2. Bor. of New York city, U.S.A. Pop. 174,400. 3. Co. seat of Wayne co., 67 m. E. of Indianapolis, on Whitewater R., Indiana, U.S.A. Important as a railway centre and as the seat of the manuf. of agric. implements, furniture, machinery, etc., it is noted also for Earlham College, chartered in 1859 and controlled by the Friends, who also founded the city. Pop. 35,100. 4. Tn. with a live-stock market and manufs., 93 m. S.E. of Louisville, and co. seat of Madison co., Kentucky, U.S.A. Pop. 7300. 5. Vil. about 90 m. S.S.W. of Quebec, in Quebec prov., Canada. Pop. 3000. 6. City and port of Contra Costa co., central California, U.S.A. Pop. 23,600. 7. Attractive suburb, 2 m. S.E. of Melbourne, in Bourke co., Victoria, Australia. Pop. 41,000. 8. Tn., noted for the Hawkesbury Agric. College, 34 m. N.W. of Sydney, in Cumberland co., New S. Wales. Pop. 1800. 9. Tn., 40 m. S.W. of Hanover, and over 50 m. E. of Victoria West, in Cape Prov., S. Africa. Pop. 1800.

Richmond and Steveston, municipality of Brit. Columbia, Canada, 6 m. S. of Vancouver, at the mouth of the R. Fraser, includes Sea and Lulu Is., on the former being Vancouver Airport. Salmon is canned at Steveston on Lulu Is. Pop. 8200.

Richter, Hans (1843-1916), Austrian conductor, b. at Raab, Hungary, studied for violin, horn, and theory, at Vienna Conservatoire, 1860. In 1866 he met

Wagner, with whose music he is pre-eminently associated. After visits to various European caps., he assumed command of court opera and the philharmonic concerts in Vienna, 1875. In 1877 he made his debut in England at the Albert Hall Wagner concerts, and in 1879 he founded the R. concerts. From 1897 he was associated chiefly with Manchester, but he also did important work at the Birmingham festivals and at the Covent Garden Opera House. He made his last appearance in 1912. R. was the greatest conductor of his day, and besides being a Wagnerian authority, he presented many of Elgar's works for the first time. Elgar dedicated his first symphony to him.

Richter, Johann Paul Friedrich (1763-1825), Ger. humorous and satirical writer, b. at Wunsiedel in Bavaria, generally known as Jean Paul, the Fr. pen-name which he himself adopted. He was the son of a schoolmaster, who afterwards became pastor at Joditz and Schwarzenbach. R. was also intended for the church, and by way of preparation for that calling was sent in 1781 to the univ. of Leipzig. There he read with eagerness the classics of Germany, France, and England, and, fired with enthusiasm, determined that he too would become a great writer. His first efforts in this direction, of a satirical nature, were not received with much favour, but in 1793 there appeared *The Invisible Lodge*, which brought him immediate fame. This was followed in 1795 by another famous romance, *Hesperus*, and by *Flower, Fruit, and Thorn Pieces*, or *Siebenkas*, in 1796-97. To this period also belong two idylls of a more finished character than is general in R.'s works, *Dominie Wuz* and *Quintus Firlein*, the former appearing in 1793 and the latter in 1796. In 1801 he married Caroline Meyer, and in 1804 finally settled in Bayreuth, where he lived a placid, simple life. The period following his marriage was prolific in literary productions. From 1799 onwards he was in receipt of a pension from the Prince-Primate Dalberg which relieved him from pecuniary distresses. In 1800-3 he wrote his great romance, *Titan*, which he himself held to be his prin. novel, and *Wild Oats*, in 1801-5. His satirical style appears again in *Schmelzle's Journey to Flatz*, known to Eng. readers through Carlyle's trans. (R. had much influence on Carlyle's style), and *Dr. Katzenberger's Trip to the Spa*, both of the year 1809. An idyll, *Libel's Life*, appeared in 1812, and in 1820-22 another romance, *Nicholas Margraf, or The Comet*. He wrote on education in his work *Lernna* (1807), and propounded his theory of art in the *Vorschule der Aesthetik* (1804).

There is a good deal of imaginative incoherency and wandering from the point to be met with in R.'s writings. With the exception perhaps of *Dominie Wuz* and *Quintus Firlein* his novels have little or no artistic form. His humour depends for its finest effects on a certain grotesqueness and eccentricity and a feeling for the incongruous.

His collected works were first pub. in 1826-38, and in a critical ed. by E. Berend (1927-42), who also ed. his letters (1922-1926). See lives and studies by J. Ait, 1925; W. Harloh, 1925; W. Meier, 1926; and M. Kommerell (2nd ed.), 1939; also P. Stapfer, *Humour and Humorists*, 1911, and E. Berend, *Jean Paul und die Schweiz*, 1943.

Richthofen, Manfred, Baron von (1882-1918), Ger. airman, b. at Breslau. He was appointed commander of the 11th Chasing Squadron in Jan. 1917. His 'circus', or squadron, of planes was remarkable for the number of planes they brought down. R. received the Order Pour le Mérite in 1917, and later the Order of the Red Eagle with Crown and Swords. In his *Memoirs* (Aug. 1917) he speaks highly of the Brit. airmen's fighting qualities, and he himself had a reputation for chivalry in air combats. The command of his squadron passed to Hermann Goering (q.v.) after R.'s death in battle over the W. front.

Rickert, Heinrich (1863-1936), Ger. philosopher, b. at Danzig. With his teacher W. Windelband, he was a leader of the Baden school, building up neo-Kantianism to a philosophy based on values. His works include *Der Gegenstand der Erkenntnis* (5th ed. 1928) and *System der Philosophie* (vol. 1, 1921). See study by A. Faust, 1921.

Rickets, or Rachitis, constitutional disease of the first two or three years of infancy, characterised by improper or incomplete development of bone. The symptoms, which are not marked until the latter end of the first year, are digestive disorders, loss of appetite, weakness, diffuse tenderness, and sweating about the head and neck. The bones are soft, but the first indication of malnutrition of the osseous structures is seen in the enlargement of the ends of the bones, as in the wrists, ankles, and junction of the ribs with the costal cartilages. The imperfect development of bone may give rise to bowed legs, knock-knees, curvature of the spine, distortion of the pelvis, square head, or other deformities, while dentition and the closing of the fontanelles in the skull are delayed. The cause of R. is a shortage of vitamin C, which is present in cod-liver oil and can be formed by the skin in presence of sunlight. Treatment should aim at better nutrition and a healthier environment. Breast-fed infants with good surroundings as regards air, light, and cleanliness are not likely to develop the disease. It is not hereditary in the usual sense.

Ricketts, Charles (1866-1931), Brit. painter, b. at Geneva. In 1896 R. started the Vale Press, a series of octavo reprints for which he designed the type founts known as Vale, Avon, and King's, together with numerous engraved illustrations. R. also did a number of beautiful pen-drawings for different pub., one of his best being 'Edipus and the Sphinx.' He was elected associate of the Royal Academy in 1922. His chief pictures in public galleries are 'The Death of Don Juan' (Tate Gallery), 'The Plague' (Musée

de Luxembourg, Paris), and 'Montezuma' (Manchester). His later contributions to the Academy included mostly painted illustrations to literature, drama, or music. R.A. in 1928. He pub. *The Prado and its Masterpieces*, a book on Titian, and *Unrecorded Histories* (1933). See memoir by T. S. Moore, 1933.

Ricketts, Howard Taylor (1871-1910), Amer. pathologist, after whom are named the Rickettsia bodies living in lice and other arthropods, whence they may be transmitted to man and animals. *Rickettsia prowazeki* causes typhus fever; *R. psittaci* is responsible for psittacosis (q.v.) in parrots and occasionally in man.

Rickmansworth, tn. of Hertfordshire, England, 4 m. W.S.W. of Watford, on the Rs. Colne, Gade, and Chess and the Grand Union Canal. It is primarily residential, but it has printing works and manufs. of paper, asbestos, and lorrys. Pop. 25,000.

Ricochet, name given to the rebounding from a flat surface, as of a stone from water, or cannon ball or bullet from ground or water; the motion commonly known as 'ducks and drakes.' Vauban (q.v.) in the siege of Philippsburg in 1688 introduced his invention of R. batteries, in which the projectiles were so fired as to R. into the besieged tn. In firing at a fortification sufficient elevation was given just to clear the parapet, so that the projectile might bound along the banquette without rising far above its level. It was effective on smooth hard ground against bodies of men or such obstacles as abattis, and also upon water, with either round shot or rifle-balls.

Riddell of Walton Heath, George Allardice Riddell, first Baron (1865-1934), Brit. newspaper proprietor, b. at Brixton, London, son of James R., a photographer, of Whitstone. R. was first in England in solicitors' law final examination and admitted to the rolls in 1888. He practised first at Curdiss, and afterwards and until 1903 was head of a firm of solicitors in London. When Lascelles Carr founded the *Western Mail* R. became its editor; after this he became legal adviser to the *News of the World*; in 1903 he gave up the law and became chairman of the *News of the World* and also head of the firm founded by Sir George Newnes, to which latter organisation he added *Country Life* and *John O'London's Weekly*. Knighted 1909. He played a prominent part in the settlement of the coal strike of 1912. He became friendly with Lloyd George, 1919, and was appointed press representative at the Versailles peace conference, and acted in a similar capacity at other conferences in 1921 and 1927. In 1920 he was raised to the peerage. R. gave £100,000 to the Royal Free Hospital, of which he was president in 1925; also a similar sum to the Eastman Dental Clinic. He wrote *War Diary, 1914-18* (1933); *Intimate Diary of the Peace Conference and After, 1918-23* (1933); and *More Pages from my Diary, 1908-14* (1934).

Riddings, industrial par. in the Alfreton urb. dist., Derbyshire, England, 3 m. S.S.E. of Alfreton. It has coal-mines,

iron foundries, and factories manufacturing chemicals, floor blocks, and concrete products. Pop. 4400.

Riddle (Ger. *Rätsel*), paraphrastic presentation of an unmentioned subject, the design of which is to excite the reader or hearer to the discovery of the meaning hidden under a studied obscurity of expression. Anciently it was put to important uses, although in its inferior phase of conundrum it was a part of the intellectual entertainment at Gk., and afterwards at Rom., banquets. In the E. it naturally associated itself with symbolical modes of thought, and was also, as it still is, abundantly employed for didactic purposes. The so-called proverbs or sayings attributed to Solomon frequently assume the form of Rs. Every reader of the O.T. is familiar with the R. which Samson proposed to the Phillistines, and the 'enigmas' (as the Septuagint has it) that the queen of Sheba proposed to Solomon. The R. is found in the Koran, and sev. books of Rs. exist in Arabic and Persian. It would appear that they were also known to the ant. Egyptians, while among the Gks. they were allied in the earliest times with the *oracula*, or mystic utterances of the inspired priests, and were generally in verse. Even the greater poets did not refuse to introduce the R. into their writings, and the lt. of the Sphinx is probably the most celebrated in the whole circle of philosophical puzzles. Among the Roms. professional R. makers did not make their appearance till the latest period of Rom. literature, the reason assigned for which is, the superior gravity and earnestness of the Rom. genius. Apuleius wrote a *Liber Ludicorum et Grifhorum*, but it is no longer extant. The R., more as an amusement than as a serious intellectual effort, was much cultivated during the Middle Ages. The Reformation checked the merry pastime of R.-making, but in the seventeenth century it came into favour again. The Abbé Cotin was a famous fabricator of Rs. In the eighteenth century the taste for the manuf. of Rs. continued to increase, and most of the brilliant Fr. *littérateurs* did a little in this line. In Germany Schiller gave a broader development to the R. In his hands it again became something grave and sibylline and attained a high degree of literary force. See also CHARADES.

Rideau Canal, in Ontario, Canada, connecting Ottawa with Kingston, on Lake Ontario, by way of the Rideau R. and lake, and by connections with the Mud Lake and Cataract R. The canal, built between 1826 and 1831, is 126½ m. long, and has a navigable depth of 4½ ft.; it has greatly declined in importance since the advent of railways. Rideau Hall, at Ottawa, is the residence of the governor-general.

Ridgeway, prehistoric track along the Eng. Berkshire Downs from White Horse Hill to Streatley, S. of and parallel to the Icknield Way. See H. F. Timperley, *Ridge Way Country*, 1935.

Ridgway, co. seat of Elk co., Pennsylvania, U.S.A., on the Clarion R., 719

m. S.E. of Erie; it has tanneries, dynamo and engine, iron, clay, and lumber works. Pop. 6000.

Riding is practised in four different main systems: (1) ordinary R.; (2) rough R.; (3) military R.; (4) ladies' R. But of each system there is one general principle, that good horsemanship depends on balance, grip being left to exceptional moments of insecurity. The rider should always strive for a firm, natural seat and a well-braced back, and he should hold the reins fairly long to allow full freedom to the horse's head. In mounting a man should stand alongside the horse's near or left shoulder, and with the reins in his left hand should take hold of the mane; the left foot is placed in the near stirrup with the right hand, which is then placed on the cantle as far to the off-side as possible. In the spring as little weight as possible should be put on the stirrup; the right leg is swung over the animal's back and the rider sinks lightly into the saddle. The feet should be placed well in the stirrup, not under the ball of the foot, since this throws the seat out of alignment, and a good rider naturally avoids putting his weight on the stirrups as he avoids hanging on to the reins. In learning to ride bare-backed, practice is invaluable, and as many different horses as possible should be practised on, beginning with a thoroughly trustworthy animal, so that the rider's actions become automatic. In ordinary R. the reins should be held in both hands, especially when using a double-bridle (see BRIDLE). Rough riders greatly depend for security of seat on the construction of their saddles. With the development of international competitions, such as the Olympic Games (*q.v.*), military R. has much improved in recent years. It is of a composite character, and calls for skill, adaptability, and very thorough training. Ladies' R., which is side-saddle R., has been almost completely replaced in popularity by the cross-saddle. This is to be regretted not only on account of the loss of elegance and tradition, but also because in many cases a woman can maintain a better balance, and greater control of her mount, when R. side-saddle. To mount, the rider holds the offside of the saddle seat, with the reins in the right hand and the left hand on the top pommel. Then placing the left foot in the stirrup she straightens the knee and lightly steps into the saddle with a little twist. See also CAVALRY; DRESSAGE; FOX-HUNTING; HAUTE-ÉCOLE; HORSEMANSHIP; POLO; RACING; STEPLECHASING. See W. Fawcett, *Elements of Horsemanship*, 1932, and *Riding and Horsemanship*, 1935; H. D. Chamberlain, *Riding and Schooling Horses*, 1935; J. Phillis, *Breaking and Riding*, 1937; S. Kourmakoff, *School for Riding*, 1939; Maj. D. Marsh-Macmillan, *Equitation and Horsemanship*, 1948; E. Harrison, *Riding: a Guide for Beginners*, 1949; Lt.-Col. W. E. Lyon (ed.), *The Horseman's Year*, 1949.

Riding, name of the three administrative divs. of Yorkshire, England. The old word, used in Scandinavia, was 'thrithing'.

Ridinger, Georg (1568-1616), Ger. architect, b. at Strasburg. Between 1605 and 1614 he designed the castle at Aschaffenburg, one of the outstanding buildings of the Ger. renaissance.

Ridley, Nicholas (c. 1500-55), Eng. prelate, b. in Northumberland and educated at Pembroke Hall, Cambridge, where he first became imbued with the spirit of the Reformation. He became chaplain to Archbishop Cranmer (1537), chaplain to Henry VIII., canon of Canterbury (1541), and of Westminster (1545), and bishop of Rochester (1547). He quickly became one of the leaders of the Reformed Church, took part in the first revision of the Prayer Book (1548), and succeeded Bonner as bishop of London in



BISHOP RIDLEY

1550. R. was not an extreme reformer, and that Anglicanism retains so many of the usages of the medieval church may be due to his moderating influence. On the death of Edward VI., R. supported Lady Jane Grey, but was arrested by Mary and sent to the Tower. In 1554 he was condemned for heresy and burned at Oxford, at the same time as Latimer (1555). See his *Life and Works*, ed. by H. Christmas, 1841, and J. C. Ryle, *Bishops Latimer and Ridley*, 1925.

Riel, Louis (1844-85), Canadian agitator, b. at St. Boniface, Manitoba, championed the cause of the Métis or half-breeds, to whom he belonged by reason of his Fr., Indian, and Irish descent. The first rebellion which he headed was in 1869. It arose out of the hostility of the settlers at Red River to the transfer of the N.W. Terr. from the Hudson's Bay Company to Canadian administration. In all the discussions preceding the transfer, the one group whose interests had not been consulted were the settlers already in the N.W., who numbered about 10,000, the most numerous of these being

the Métis, who regarded themselves as pioneers of Fr.-Canadian settlement on the plains. The Métis feared they might lose their language and schools. In R., an inveterate enemy of the Canadian Gov. domination, they found a leader and decided to oppose the new regime. A 'provisional gov.' under R. was set up, but in the next year the dispute was compromised in the Manitoba Act, which granted a prov. gov. at Red River and recognised the right of the Fr.-speaking settlers to their language and schools. R. escaped, and in 1873 was elected to the dominion Parliament, but expelled and outlawed. Unbalanced in judgment and vain, qualities aggravated in 1884 when he headed the second rebellion of Métis, he was none the less sincere and in some ways able. On the occasion of the second rebellion there was discontent among the Indians of the Saskatchewan region, as well as among the Métis. The latter were especially disaffected over the Ottawa Gov.'s failure to grant them titles to their farms, while the Indians brooded over their lost freedom. It was in these circumstances that messages were sent to R. and the rebellion broke out in March 1884. The gov. of Ottawa was taken by surprise but moved with alacrity. Troops were sent from Winnipeg to hold the new railway which had recently been completed from there to the mts. The rebellion ended almost as suddenly as it began. One main engagement lasting three days was fought at Batoche; the settlement was captured and R. surrendered a few days later and was executed. See G. W. Brown, *Building the Canadian Nation*, 1942.

Riemann, Georg Friedrich Bernhard (1826-66), Ger. mathematician, b. at Breselenz, near to Dannenberg, Hanover. He denied the axiom that two straight lines cannot enclose a space, and advanced proofs to show that observation cannot establish that space is strictly Euclidean. He attempted to show that it may be finite, though like Euclidean space, unbounded. In his geometry every straight line would return into itself and be closed, just the same as a geodesic on a spherical surface. His system of non-Euclidean geometry is practically that of spherical space, that is, the surface of an ordinary sphere. Riemannian space and curvature tensors have been incorporated in Einstein's relativity theory and other modern cosmological theories.

Riemann (Karl Wilhelm Julius) Hugo (1849-1919), Ger. musical scholar, b. at Grossmehlra, near Sondershausen. He studied music at the Leipzig Conservatoire, and later became lecturer at the Univ. there from 1878 to 1880, and again, after various appointments elsewhere, from 1895 to 1901, when he became prof. Among his many works on musical subjects are a *Musiklexikon*, *Handbuch der Musikgeschichte*, *Opernhandbuch*, works on notation, harmony, phrasing, hist., etc. He ed. many standard works. R.'s greatest service to music lay in his knowledge of and emphasis on the musical traditions of the past. He was, however,

far from a narrow traditionalist, believing that an acknowledgment and sense of musical continuity was vital to the balance of modern music. See H. L. Denecke, *Die Komposition-Lehre Hugo Riemanns*, 1937.

Riemenschneider, Tilman (11460-1531), Ger. mason and sculptor, b. at Osterode. He was one of the most outstanding of Ger. sculptors: he combined the tenderness of late Gothic styles with a sensuousness that foreshadowed baroque; his work has a rare quality of piety and pathos, and is, at the same time, essentially spontaneous. One of his most decorative yet appealing sculptures is the 'Madonna' in the cathedral at Würzburg, executed about 1503. See lives by C. Streit, 1888; H. Schrade, 1927; F. Knapp, 1935; K. Gerstenberg, 1940; and K. H. Stettin, 1944.

Rienzi, Cola di (1313-54), Rom. political reformer, b. in Rome. The son of a tavern-keeper, he was an enthusiastic student of ant. Lat. literature, and thus gained the desire to restore the former greatness of Rome. His zeal for reform received an impetus from the murder of his brother by a noble. He became a notary of some importance, and in 1343 went on a mission to Pope Clement VI. at Avignon. He won the papal favour, but returned to Rome in 1341, and in May 1347 invited all the citizens to a meeting in the Capitol. The new laws he proposed were at once adopted, and he was made tribune of the new republic. For a short time his rule was popular and successful, but his arrogance disgusted both his own people and foreign princes, and the nobles, with the consent of the pope, drove him out of the city at the end of the year. He was restored by Innocent VI. in Aug. 1354, but was killed by the mob in Oct. See Bulwer Lytton, *Rienzi*, on which Wagner's opera was based. See also lives by P. Mar, 1931, and V. Fleischer, 1918.

Riesa, tn. of Saxony, Germany, on the R. Elbe, 12 m. N.W. of Meissen. The harbour is good, and one of the chief industries is boat-building. Steel, textiles, and marble are produced. Pop. 26,200.

Riesengebirge, chain of mts. between Silesia and Bohemia, and part of the Sudetic range. They culminate in the height of Schneekoppe (5265 ft.), and form a much-frequented tourist centre.

Rieti, tn. in the prov. of the same name, Italy, 40 m. N.E. of Rome. It is an old Sabine city, and has a fifteenth-century cathedral. Wheat and sugar-beet are grown in the area. Pop. 34,700.

Rievaulx, or **Rivaulx**, Abbey, Cistercian foundation situated in the N. Riding of Yorkshire, 2½ m. N.W. of Helmsley, dating from 1131, and now in ruins. The word means 'valley of the Rye' from a small riv. that flows by the ruins. There is a vill. of R.

Rif, **Er Rif**, or **Riff**, mountainous strip of coast in N. Morocco, stretching from Ceuta to Algeria. There are some 1,500,000 inhab. in the R. country.

Rifle. The main varieties of military Rs. are described in the article GUN; it is

proposed therefore to deal with sporting Rs., and also with shotguns in general in this article.

A sporting R. is a weapon designed for shooting game of various kinds. All modern Rs. are of the breech-loading type, and fire a cartridge made up of four components: (a) A brass cartridge case which serves as a holder for the propellant powder and also as a gas seal preventing a flow of gas rearwards; (b) the propellant powder; (c) a priming cap; (d) the bullet. The barrel is rifled, i.e. there are spiral grooves to impart a high rotational velocity to the bullet to ensure that it maintains equilibrium in flight. The cartridge is supported in the breech of the barrel by a member known as the breech block, which usually contains the firing mechanism. The latter normally consists of a pin known as a striker, capable of indenting the cartridge. Pressure on the trigger actuates a piece known as the sear, which releases the striker or hammer, which is then thrown forward to fire the cartridge by means of a powerful spring which hitherto has been kept in a state of compression.

Sixty years ago the double-barrelled sporting R. was in general use, of very large calibre for elephants and other pachyderms (10 and 12 bore, .600 in., .577 in., .500 in.), medium calibre such as .450 in., .375 in., and 9 mm. being preferred for dangerous soft-skinned animals, and the smaller calibres, .303 in. and 8 mm., being reserved for deer and antelope. The heavy calibre Rs. have gradually been ousted, largely owing to the fact that they are very cumbersome because of their great weight. Moreover the 'double' R. was designed for cartridges of low chamber pressure which relied for their high striking energy on heavy projectiles propelled at a somewhat low velocity rather than the use of lighter projectiles at a relatively higher velocity. The chief advantage of this type of R. over other patterns is that the hunter is assured of a rapid second shot should this prove necessary, an important point when confronted with dangerous big game. Apart from ballistic considerations and the modern preference for high-velocity hunting weapons, the 'double' R. is very expensive and costs at least five times as much to produce as the single barrel bolt action magazine R. which is now by far the most universally used sporting weapon. The most popular types of bolt actions employed are those based on the Mauser system, and are identical in essentials to the Ger. military R. (Model 1898) action (see GUN).

The cartridges of European manuf. for hunting purposes which are most often met are as follows: 6.5 mm., 7 mm., .303 in., 7.9 mm., 9 mm., 9.3 mm., .375 in. H. and H. Magnum, and 10.75 mm. Another pattern bolt action R., which achieved popularity between 1905 and 1939 was the Mannlicher-Schoenauer (particularly in .256 in. (6.5 mm.) calibre) manufactured in Austria. In the U.S.A. the bolt action R. is popular, but in many parts of the Continent, where hunting is carried out on

horseback, the need for a good saddle R. is felt, and consequently the lever action R. is found more convenient. In this weapon the breech block is operated by means of raising and lowering a lever which is, in point of fact, a trigger guard extension; the magazine is usually of the tube type located immediately beneath the barrel.

The main developments in the U.S.A. of recent years indicate a marked tendency towards reduction in calibre and increase in velocity, great strides having been made in extraordinarily accurate small bore cartridges (.22 in. to .27 in.) with a very flat trajectory, yet by virtue of their high velocity (3000 to 4000 ft. per sec.) may be used on small game satisfactorily and humanely. The two best-known cartridges in this class are probably the .220 in. Swift and .22 in. Hornet. A multitude of similar cartridges are used for 'vermin' shooting, which has developed in recent years into a serious sport. Unquestionably the .22 in. rim-fire sporting R. is the most popular in all countries. Unlike the R., hitherto mentioned, the cartridge utilised for this R. contains its priming in the base rim, which is exploded by a blow from the striker on firing, hence the term 'rim-fire,' as opposed to 'centre-fire' cartridges containing a priming cap in the centre of the base of the cartridge. .22 in. rim-fire R.s. are most effective on small vermin and rabbits up to 100 yds., and make excellent practice target weapons; ammunition is relatively cheap and plentiful.

R. sights fall into three basic categories: (a) Open 'iron' sights; (b) aperture sights; (c) telescopic sights. Both 'iron' and aperture sights have a common type of foresight which consists of a projecting blade fixed to a ramp bed located on the end of the barrel. The open 'iron' back-sight consists of a raised piece of metal with a 'U' or a 'V' notch cut in the centre of it. Aim is then taken by getting the tip of the blade or the bed of the foresight in line with and in the centre of the shoulders of the 'U' or the 'V' of the backsight; the height of the backsight can usually be elevated or depressed for varying ranges. In the aperture rearsight, instead of a 'U' or a 'V' notch, there is merely a ring in the centre of which the tip of the blade of the foresight must be located for an accurate aim. In the telescopic sight a graticule in the form of a cross is incorporated. When taking aim the intersection of the cross wires of the graticule are superimposed on the target.

Shotguns have changed little in the last fifty years; they can be divided into four main categories: (a) Those with double barrels arranged side by side or superimposed, known as 'over and under'; (b) single barrel guns without magazines; (c) single barrel guns with three- or five-shot magazines semi-automatic; (d) as (c) above, but the loading and ejection of cartridges is achieved manually by means of a pump action. The double barrel (side by side) is the most common Eng. shotgun, and is manufactured in 12, 16, 20, 28, and .410 in. bores, the 12 bore being

most often encountered in the United Kingdom. There is a variety of well-known action systems, such as Purdey, Holland & Holland, and Anson & Deeley. The modern trend is for 'hammerless' guns, i.e. guns in which the action is totally enclosed within the body.

See G. Burrard, *Notes on Sporting Rifles*, 1920, and *The Modern Shotgun*, 1932; E. Keith, *Big Game Rifles and Cartridges*, 1943; T. Whelen, *Small Arms, Ballistics and Design*, 1945; and C. S. Landis, *Twenty-two Calibre Varmint Rifles*, 1947.

Rifle-bird, or Rifleman-bird, bird of paradise known as *Ptiloris paradisea*. It occurs in Australia and New Guinea, and is purplish-black in colour with patches of green bronze. The Eng. name is said to have been given by settlers in Australia from the resemblance of the colour of the plumage to that of the uniform of the Rifle Brigade.

Rifle Brigade, one of the most famous infantry regiments of the Brit. Army, raised in 1800 as the Rifle Corps, or Corps of Riflemen, and drawn from various line regiments. The riflemen were used, like the Fr. *firailleurs*, to cover the front of the ordinary infantry by scouting and skirmishing. Hence their green uniform, for camouflage, and the bugle used to give commands, which forms a part of the badge of all rifle regiments. Three other battalions were added in 1805, 1855, and 1857, and until after the First World War the R. B. shared with the Royal Fusiliers, Middlesex Regiment, K.R.R.C., and Shropshire Light Infantry the distinction of being the only line regiments with four battalions, or more than two. With so many battalions the R. B.'s battle honours are necessarily numerous, including the battles of the Peninsular war, S. Africa (1846-47; 1851-53), the Crimean war, the Burmese war, 1855-57; Khar-toum, and the S. African war. In the First World War the R. B. was augmented by numerous regular special reserve, service, and territorial battalions, including the Tower Hamlets Militia. Various battalions of the R. B. figured in practically every important battle of the First World War, from Mons in 1914 to Valenciennes in 1918. They were especially conspicuous in the fighting of 1914, at Mons and Le Cateau; in 1915 at St. Eloi; in 1916 at Beaumont-Hamel and at Guillemont; in 1917 at Ypres; and in 1918 at Villers-Bretonneux and Cambrai. In 1939-40 the R. B. fought in France, and was conspicuous at the defence of Calais. Converted to lorried infantry after Dunkirk it fought in armoured divs. in the N. African and It. campaigns, and was among the units which landed in Normandy in June 1944, serving in N.W. Europe until the Ger. collapse.

Rift Valley, geological structure formed by the sinking of a strip of land between two unmoving parallel faults. The E. African lakes and the Dead Sea occupy R. V.s., and the Rhine valley is another example, lying between the Vosges Mts. to the W. and the Black Forest granites to the E.

Riga, cap. of the Latvian S.S.R. and

a seaport, lies 8 m. above the mouth of the Dvina, before it enters the gulf of Riga, and 366 m. by railway S.W. of Leningrad. Formerly the centre of the export trade of N.W. Russia, it suffered severely during Russia's economic collapse, but gradually recovered. There are manufs. of textiles, chemicals, rolling stock, building materials, etc. It still preserves some of its anct. buildings of the period when it was a great Hanseatic League tn., and also of the period when it belonged to the Teutonic knights. The castle of Walther von Plittenburg, master of the knights (1500), was the seat of the government before the Second World War. The present cathedral, built in the sixteenth century, replaces the old church, St. Mary's, built 1215, the organ in which is one of the largest in the world. It has a univ., estab. 1919. R. became Russian in 1710, having been long an object of strife between Russia, Poland, and Sweden. It was the scene of much fighting during the First World War, being captured by the Gers. in 1917. Bolsheviks took the city in 1919, but were expelled the same year. It became the cap. of Latvia on the formation of the republic in 1918. In the Second World War the Russ. took Latvia in June 1940 and incorporated the country into the U.S.S.R. The next year the Gers. seized the greater part of Latvia and R. became a powerful Ger. stronghold and naval base, but in Oct. 1944 it was recaptured by the Soviet generals Maslennikov and Frenenko (see EASTERN FRONT IN THE SECOND WORLD WAR). Pop. 378,000. See Z. Ligers, *Histoire des villes de Lettonie et d'Estonie*, 1946.

Rigadoon (Fr. *rigaudon*), Fr. dance probably originating in the S. (Provence or Languedoc), dating back to the seventeenth century at the latest. It is in lively common or 2-4 time, and consists of three or four parts, each repeated, the third being the shortest.

Riga, Gulf of, gulf of the S. coast of the Baltic Sea, S. of the gulf of Finland. It is 100 m. long and 60 m. broad at its widest. The greatest depth is 22 fathoms, and it is frozen for about 120 days in the year. The R. Dvina flows into it past the seaport tn. of Riga (q.v.).

Rigaud, Hyacinthe (1659-1743), Fr. portrait painter, b. at Perpignan, entered the Ecole des Beaux Arts in Paris in 1681. At Le Brun's suggestion he studied in Rome, and formed his style on that of Van Dyck. A diligent worker and a careful artist, he counted Louis XIV., Le Brun, Boileau, Bossuet, and Charles XII. of Sweden among his sitters. 'Marie Serre' (his mother) is perhaps his masterpiece. See life by J. Roman, 1919.

Rigel, or β Orionis, seventh brightest star, its magnitude being 0.3. Its spectrum shows it to be of the helium type and a short-period binary of twenty-two days. Its distance is about 600 light-years and its luminosity is 17,000 times that of the sun. Its spectrum shows that it belongs to the B3 class, in which hydrogen lines are prominent, but the helium lines, observed in great intensity in class B2, have hardly

faded out. Stars of this type have temps. of about 20,000° C. R. has a companion distant 9.6" of mag. 8, which is itself a double star.

Rigging, see under SAILS and RIGGING; YACHTS.

Righi, see RIGI.

Right Ascension (in astronomy), see ASCENSION, RIGHT.

Right of Way, right which a person or body of persons has of passing over another's lands. It is in the nature of a privilege or convenience and not a profit (see also EASEMENTS; INCORPOREAL CHATTELS; HEREDITAMENTS; LAND LAWS; PRESCRIPTION). A R. of W. by necessity arises where A grants (see GRANT) a piece of land to B surrounded by other land of A's; for if a R. of W. were not implied B could never get to the land bought from A. Public Rts. of W. usually arise either by express grant or by prescription. See also FOOTPATHS, AND PRESERVATION OF.

Right, Petition of, see PETITION OF RIGHT. **Rights, Declaration and Bill of**, see BILL OF RIGHTS.

Right-whale (*Balæna*), genus of whales, characterised by the large head and mouth, long plates of whalebone being attached to the palate, and by the absence of the dorsal fin. The Greenland or R. (*B. mysticetus*) is the best-known Cetacean, and was long supposed to be of world-wide distribution. Other species have, however, been identified, including the S. or Cape whale (*B. australis*).

Rigi, or **Righi**, mt. of Switzerland, rising between the lakes of Lucerne and Zug. Altitude 5906 ft. Its popularity with tourists is due to the fine view it commands. The summit may be reached by a railway from Vitznau, on the S., or by one from Arth, on the E.

Rigidity, see under ELASTICITY and STRENGTH OF MATERIALS.

Rigor, sensation of chill accompanied by shivering, which is characteristic of the initial stage of many feverish conditions. Notwithstanding the feeling of intense cold, the actual body temp. is higher than normal, and the sensation is due to a disturbance of the cutaneous heat-regulating mechanism, the surface capillaries being for the time constricted. This is generally accompanied by internal congestion, and the cold sensation is followed by a feeling of heat as the blood temp. gradually rises. In most forms of malaria there is a regular succession of cold and hot fits with little difference in body temp.

Rigor Mortis, see under DEATH.

Rig Veda, see under VEDA and VEDISM.

Rijeka, see FIUME.

Rijssel, see LILLE.

Rijssen, see RYSSSEN.

Rijswijk, see RYSWICK.

Rikwa, **Rukwa**, **Likwa**, **Hikwa**, or **Leopold Lake**, in Tanganyika Terr. E. Africa, situated between Lakes Tanganyika and N'gasa. It was discovered by Joseph Thomson in 1885, and is salty and ammoniacal.

Riley, Charles Valentine (1843-95), Amer. entomologist, b. in London and

educated at Dieppe and Bonn. He went to the U.S.A. in 1860. He became state entomologist in Missouri, and his activities during the locust plague of 1870, when he correctly forecast the date on which the plague would end, brought him into prominence. He went before Congress and secured an appropriation for a commission of entomology to deal with future problems of this nature. R. also investigated the problem of the phylloxera insect which was causing great destruction to Fr. grapes. In 1878 he became entomologist to the newly formed Dept. of Agriculture at Washington. He dealt successfully with the citrus scale which had attacked the Californian orange-groves; but a change of president found him out of favour with the administration, and R. resigned, continuing his research work privately. R.'s fine scholarship was combined with a spirit of enterprise and an infectious enthusiasm: his efforts ensured federal and state recognition of the value of the entomologist in preventing famine and hunger and increasing agricultural production.

Riley, James Whitecomb (1853-1916), Amer. dialect-poet, b. at Greenfield, Indiana, son of Reuben A. Riley, a lawyer. Disliking law, he became an itinerant sign-painter, actor, and mimic entertainer. He worked on the Indianapolis *Journal* from 1873; writing verses for it, chiefly in Hoosier dialect. *The Old Swimmer's Hole* and *Seven More Poems*, 'by Benj. F. Johnson, of Boone,' 1883, was his first book. Perhaps the most widely popular of his poems (which are nearly all short) is *Little Orphan Annie* (1885).

Rilke, Rainer Maria (1875-1926), Austrian poet, b. in Prague of Bohemian and Alsatian stock. He was educated at the military academies of St. Polten and Weleskirchen, but then decided to adopt a literary career. He studied literature and the hist. of art in Munich and Berlin, and visited Russia. In 1901 he married Clara Westhoff, the sculptress. R. travelled a great deal in Europe, living for some time in Paris, where he was Rodin's secretary. He spent the last seven years of his life in Switzerland. R.'s position in literature is somewhat isolated; his closest affinities probably lay with the Dan. mystic-romantics and the Fr. symbolists, and it was in France that he gained the greatest bearing and spent his happiest years.

His first collection of poems, *Leben und Lieder* (1894), are generally conventional and show few signs of his latent genius. They show the influence of Heine and not that of the then fashionable Impressionist poets. In *Advent* (1898) and *Myr sur Feter* (1899) he moved further towards a depersonalised idiom in an attempt to arrive at a standpoint of complete objectivity and realism. When he fully achieved this, as in many of the *Duineser Elegien* (1923) and the *Sonnets an Orpheus* (1923), the intense, all-pervasive spirituality of his poetry has few rivals. Such a poetic ideal, however, leaves no room for mediocrity, and when R. fails to achieve it completely his work is jarring and the

style artificial. His apparent ability to detach himself from the universe in order to see, as a spectator, the greatness of God and puniness of Man, and from these to understand and convey eternal, fundamental truths, is unique. He tried to sublimate everything in his poetry to the central theme of man's struggle for spiritual vision and clarity. His own religious crises and triumphs became symbolic of the struggle, death, and regeneration of mankind. Besides the works mentioned above other notable pubs. of R. include *Buch der Bilder* (1903) and *Die Aufzeichnungen der Malte Laurids Briggs* (1909).

His collected works were pub. in 1879 and *Letters* (ed. and trans. by R. F. C. Hull) in 1948. See lives and studies by A. Schaffer, 1921; R. Faesi (2nd ed.), 1922; E. Jaloux, 1927; E. M. Butler, 1943; and Nora Wydenbruck, 1949; also Princess Thurn und Taxis, *Erinnerung an Rilke*, 1933; M. Betz, *Rilke räumt*, 1937; E. Jaloux, P. Valéry, and others, *Rilke et la France*, 1942; R. Guardini, *Zu Rilkes Deutung des Daseins*, 1946; and J. Gebser, *Rilke und Spanien* (2nd ed.), 1946.

Rimbaud, Jean Arthur (1854-91), Fr. poet, b. at Charleville in the Ardennes. As a boy he displayed extraordinary talent, and, having run away from home three times, his poem *Le Bateau ivre* won him the friendship of the poet Verlaine. Subsequently he lived an adventurous life as tramp, soldier, and merchant by turns. While he was living in Abyssinia, his friend Verlaine, believing him to be dead, pub. his poems under the title of *Les Illuminations* (1886). These took Paris by storm and originated the 'decadent' movement, and from R. stem also the *Symbolistes* and the surrealists. A further vol. of his poems, *Reliquaire*, was pub. in 1891. His complete works were pub. by the *Mercur de France* (2nd ed.), 1898. See lives and studies by P. Berlichon, 1912; H. Jacob, 1921; J. M. Carré, 1924; R. de Rénéville, 1929; E. Y. Gauclette, 1936; J. Rivière (2nd ed.), 1938; Enid Starkie, 1938, 1947; W. Fowle, 1946; also P. Verlaine, *Les Poètes maudits*, 1884; M. Raymond, *De Baudelaire au surréalisme*, 1933; Enid Starkie, *Rimbaud in Abyssinia*, 1937; Marguerite Y. Méléra, *Résonances autour de Rimbaud*, 1946.

Rime, deposits of white ice crystals, similar to hoar frost, on the windward side of objects, by a wet (super-cooled) fog at temps. below freezing. This is soft R.; hard R. is when the ice is formed so quickly that solid clear ice is formed to windward; it may extend for sev. inches. Hard R. is distinguished from glazed frost in that it is formed in fog or drizzle with wind, whereas glazed frost occurs on all surfaces, and accumulates round twigs or telegraph wires when super-cooled rain falls.

Rime, see RHYME.

Rime Giant, see YMR.

Riming Poem, see RHYME SONG.

Rimini, Francesca da, see FRANCESCA DA RIMINI.

Rimint (Lat. *Ariminum*), seaport of Italy in the prov. of Forlì, Emilia, on the

Marecchia, 2 m. from its mouth in the Adriatic. The most interesting of its buildings are the anct. castle of Sigismondo Malatesta (1448), now used as a prison; the fifteenth-century cathedral, or Tempio Malatestiano, one of the most important monuments of the Renaissance in all Italy; originally a Franciscan church of the thirteenth century, it was remodelled in 1450 by Sigismondo Malatesta and Leon Battista Alberti was the architect of the exterior, the church of St. Giuliano, and the bridge and arch of Augustus. Among the modern buildings

also escaped. The Castello Sigismondo sustained damage but remained structurally sound. Pop. 74,600.

Rimmon, or Hadad, Assyrian thunder god, mentioned in 2 Kings xviii., where Naaman, after his healing by Elisha, seeks pardon from the latter if in the course of his duties as a 'captain of the host of the King of Syria' he worships in the temple of R. at Damascus.

Rimouski, tn. of Quebec, Canada, 180 m. E. of Quebec. There are saw-mills, peat mines, and a cod-liver oil refinery; the tn. has an agric. college. Pop. 7000.



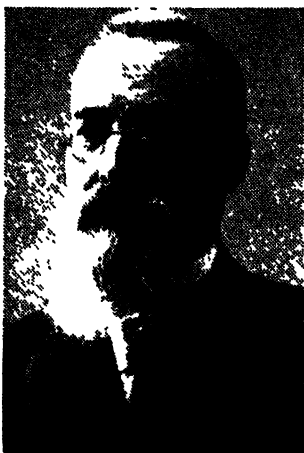
Rimini and the Marecchia Canal

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are an archaeological museum and a municipal picture gallery. Here the Flaminian Way ends. The tn. has fisheries, mineral springs and baths, silk mills, brick-works, sulphur furnaces, iron works, and foundries, and the sea bathing attracts many visitors in the summer. It was the site of the Council of Arians and Athanasians (359). It was held in turn by Byzantines, Goths, Longobards, and Franks. The notorious Malatestas reigned at R. for three centuries from 1203. It was then sold to the Venetians (1503) and was under papal authority from 1528 to 1860. In the Second World War it formed the E. or Adriatic end of the Gers's Gothic line, but fell to the Brit. Eighth Army on Sept. 22, 1944. It was a key-point in the Ger. line of defence and, consequently, the damage sustained by its monumental buildings was very severe. The cathedral was amongst the seriously damaged buildings, but Agostino de Ducci's reliefs of the Arts and Sciences suffered no damage. The tomb of Sigismondo, which was elaborately protected,

Rimsky-Korsakov, Nicholas Andreievich (1844-1908), Russian composer, b. at Tikhvin, near Novgorod. His youthful promise in music led to nothing until he joined the nationalist school with Balakirev, Cui, Mussorgski, and Borodin. His first symphony (1865, St. Petersburg) was a landmark in the list of Russian music. Retiring from the navy, R. now gave his whole efforts to music, becoming a prof. at St. Petersburg Conservatoire (1871), director of the Irc School of arts (1874-81), and conductor of the Russian symphony concerts (1886-1900). His first opera, *The Maid of Pskov*, appeared in 1872; then came a period of study, followed by another opera *The Night in May* (1878). Other operas filled with his racy music, colour, and imagination are *The Snow Maiden* (1881); *Mlada* (1893); *Christmas Eve* (1894); *Silko* (1896); *The War's Bride* (1898); *Servilia* (1901); *The Golden Cockat* (1907). He left also three symphonies, a piano concerto, and a considerable quantity of minor orchestral and instrumental music,

some songs, and some church music. See his *My Musical Life* (1923); *Principles of Orchestration, Practical Manual of Harmony* (1930); also life by M. Montagu-Nathan, 1916.



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RIMSKY-KORSAKOV

Rinderpest, or **Cattle Plague**, contagious and eruptive fever, affecting bovines, rarely sheep, camels, and certain wild ruminants, with a fatal termination in from six to ten days. Its occurrence in Britain is notifiable, but no outbreak has been reported since 1877. On the other hand, it is still prevalent in Brit. E. African dependencies and other parts of the continent. Formerly the disease used periodically to sweep over the African plains with the rapidity and ferocity of a wild fire, decimating the cattle pops. But veterinary science has gradually got this and most animal diseases under control, and in recent years grants have been made under the Colonial Development Act for the purpose of combating occasional outbreaks.

Ring (O.E. *hring*), circular ornament for the finger, ear, nose, or lip. Rs. of gold, silver, or some other precious metal are still worn in the nose and lip by savage peoples, while earrings have remained fashionable among European women. Rs. for the finger with signets engraved on the 'bezel' were used in primitive times as a seal or signature in place of writing. Ancy. Egyptian Rs. have been discovered made of gold, silver, bronze, glass, or carnelian, with an oblong bezel. The Gks. wore Rs. of great beauty, but the early Romans imitated the Spartans in wearing simple iron Rs., the privilege of a free citizen. Later ambass., senators, and high officials came to wear massive gold Rs., a custom which became generalised in the later empire. The R. formed an essential feature in the investi-

ture of eccles. dignitaries during the Middle Ages, and in England still has a part in the coronation serv.ce. All prelates of the Rom. Catholic Church and bishops of the Church of England wear the R. The pope's official R. of investiture is the 'Fisherman's Ring,' bearing a device of St. Peter in a boat. It is broken at the death of a pope. Nuns wear a R., usually of silver, to show that they are wedded to the church. The origin of the wedding R. is ancy., and is popularly supposed to have once signified the bondage of women. The betrothal R. was given in Rom. times as a pledge, and in all probability the bestowal of the wedding R. grew out of this custom and later received the sanction of the church. 'Posy' and memorial Rs. with engraved mottoes have now gone out of fashion, as also have thumb Rs. There is a splendid collection of Rs. in the Brit. Museum, augmented in 1897 by a bequest of Sir A. W. Franks, and another formed by Edmund Waterton in the S. Kensington Museum. For the former see *Catalogue* by Marshall (1907). See also C. W. King, *Antique Gems and Rings*, 1872; W. Jones, *Finger-ring Lore*, 1877; and C. F. King, *Rings for the Finger*, 1917.

Ringbones, bony enlargements on the large and small pastern bones of the horse, sometimes due to an injury and sometimes to rheumatic tendencies. Treatment is not often satisfactory. Rest is needful and a bandage of hay placed round the leg and kept soaked with cold water helps to reduce the inflammation. The application of a suitable shoe relieves the lameness.

Ring-dove, see CUSHAT.

Ringlike, see under VIKING ART.

Ringing the Changes. Larceny by the trick, when giving or receiving change, of pretending that the amount put down was greater than actually was the case, or that sufficient change has not been given.

Ring Money, generic description loosely and almost certainly inaccurately applied to those objects of gold (less often of silver or bronze) which, fashioned in the shape of rings or hoops, could be used for personal adornment in the form of torques for the neck and of armlets, bracelets, and earrings. In addition to their use as ornaments these objects undoubtedly possessed a currency value, especially when they were made of gold or silver. They are characteristic of many early civilisations, including those of the Near E.; in Europe they have been found in France and (in considerable numbers) in the Brit. Isles, and especially Ireland, being attributed to the Early Bronze Age culture of W. Europe.

Ring Ousel, mt. song-bird, *Turdus torquatus*, with brownish-black plumage, and a broad white patch on the throat. It nests in heather or on banks in moorland dists. The R. O. belongs to the thrush family and is a summer visitor to the Brit. Isles and Europe generally.

Rings, Fairy, see FAIRY RINGS.

Ring-tailed Eagle, golden eagle in its early plumage (from one to two years of age).

Ringwood, mrkt. tn. of Hampshire, England, on the R. Avon, 12 m. N.N.E. of Bournemouth, and on the W. edge of the New Forest. It is noted for its fishing. Pop. of par. between 8000 and 7000.

Ringworm, or *Tinea trichophytina*, disease of the skin due to a vegetable parasite, *Trichophyton tonsurans*. On the body (*Tinea circinata* or *marginata*) the disease is characterised by the formation of circular red patches; these lead to itching and the desquamation of epithelium in branny particles. The patch heals in the centre first, so that the appearance of a red ring is usually presented. Mercury ointment is usually effective in bringing about a cure. R. of the scalp (*T. tonsurans*) is a more obstinate condition. Round, greyish, slightly elevated patches are presented in which the hair is broken off near the skin. The spores of the parasite are found in the substance of the hair roots, and are not easily reached by any parasiticide. The usual mercurial ointment or tincture of iodine treatment may meet with success, but a previous application of X-rays in order to remove dead hairs, etc., is recommended. R. is most common among children, and a contagion is probably through spreading of the spores, an affected individual should be removed from school, etc., and all brushes and other articles suspected of contamination should be thoroughly cleansed. R. of the beard (*T. sycosis*) forms round scaly patches, which tend to become nodular and lumpy through inflammation of the underlying tissues. The treatment is the same as in R. of the scalp. Cats, dogs, and other animals are subject to R., which can be communicated by them to human beings.

Rintelen, Franz von Kleist (1883-1949), Ger. saboteur. He entered the Ger. Navy, and had a post on the naval war staff at Berlin in 1914. In 1915 he was sent to the U.S.A. as a spy. His organisation in New York smuggled bombs, which were detonated by the action of acid, on board munition ships, a scheme which caused many losses at sea. When returning to Germany he was taken from the Holland-America liner by the Brit. Naval Intelligence, and later extradited to America and sentenced to four years imprisonment for sabotage. In 1933 he related his adventures in *The Dark Invader*, which became a best-seller. R. lectured in the U.S.A. and in England, and finally settled in London. From 1939 to 1945 he was interned on the Isle of Man.

Riobamba, see CAJABABA.

Rio Branco, state of Brazil created in 1943, in the N. Boa Vista, the cap., previously belonged to Amazonas state. Area 82,749 sq. m. Pop. 14,000.

Rio Colorado, riv. of Argentina, forms the N. limit of Patagonia, and flows from the Andes E.S.E. into the Atlantic S. of the Bahía Blanca.

Rio Cuarto, garrison tn. of Cordova prov., Argentina, on the San Martín and Mitre railways, 360 m. N.W. of Buenos Aires

and 140 m. S. of Cordova. Its chief activity is agriculture. Pop. 50,000.

Rio de Janeiro: 1. Cap. of Brazil and one of the prin. seaports of S. America, is situated on the W. side of one of the finest natural harbours in the world, which measures 15 m. by from 2 to 7 m. It occupies a narrow strip of alluvial land between the mts. and the sea, being remarkable for the beauty of its position. The conical Sugar Loaf Mt., 1230 ft. high, ascended by an aerial cableway, stands at the harbour entrance, and Corcovado, 2300 ft., rises from among the buildings of the city. It is separated from the prov. of Rio de Janeiro, and constitutes an independent municipality, with an area of 521 sq. m., divided into nineteen pars. This is called the Federal Dist., and is governed by a prefect. Parts of the city have been remodelled, the E. end reconstructed, and Morro do Castella levelled, the soil being used to reclaim Sacco da Gloria. A number of skyscrapers on the Amer. model have been erected, with unfortunate effects on the beauty of the tn. The setting of the tn. between mt. and sea forms, however, an extremely attractive sight. A beautiful promenade of marble, 5 m. long, lines the waterside. The old streets are narrow, the chief of these being the Rua Direita or Rua Principe de Marco, and the Rua Ouvidor. The Avenida Rio Branco is spacious and lined with beautiful buildings, including the gov. buildings, the library, art school, supreme court and municipal theatre. Rio is the seat of an archbishop who is generally a cardinal. The churches and monastic buildings, which number over fifty, are extremely ornate, and mostly built in the Jesuit style; the La Candelaria (built seventeenth century) and La Gloria are the two most conspicuously situated. The public buildings include the monastery of São Bento, the hospital of Dom Pedro II. (built 1841), a lunatic asylum (founded 1841), and a military hospital. Among the literary and scientific institutions are the Colégio Dom Pedro II.; National Museum; Institute of Hist., Geography, and Ethnology; Military and Naval School; Lyceum of Arts; an Astronomical and Meteorological Observatory, and National Library. There are also botanic and zoological gardens. The univ. (the only official univ. in Brazil) was founded in 1920. In it are incorporated the School of Fine Arts and the National Institute of Music. There are sev. engineering and mining polytechnics in the univ. The Oswaldo Cruz Institute is devoted to experimental medicines. R. is one of the healthiest cities of the tropics, though in the sultry summer season about Christmas the gov. depts. are moved to Petropolis in the neighbouring hills. It is well served by rail, by steamship lines, by air services, and, locally, by trams and buses. The water supply, which is very abundant, is carried along elaborate aqueducts over a distance of 12 m. The bay, at the entrance (about 1 m. wide) of which are the Fort St. Juan and Fort Santa Cruz, provides a safe anchorage of 50 sq. m. Industries

include brewing, sugar refining, and flour milling, and there is an extensive trade in coffee, sugar, hides, diamonds, tobacco, timber, etc. Rio is the seat of the principal arsenal of the republic. It was discovered on Jan 1, 1502, by Gonçalo Coelho, the Portuguese navigator. Some 18 colonists were the first settlers in the neighbourhood (1555). The Portuguese took possession of it in 1567, and in 1808 the Portuguese royal family resided there. Pop. 2,052,700. 2 Coastal prov., the cap. of which is Niteroy (pop. 125,000), has an area of 26,827 sq. m., and is mountainous in the centre. It is the chief

Amer states. Each party undertakes to assist in meeting the attack. On the request of the state or states attacked and pending the decision of the 'Organ of Consultation,' each party may determine the measures which it should itself adopt to fulfil this obligation. This article applies when the attack takes place within the territory of an Amer state or within a region bounded in the way specified. These boundaries completely enclose the Amer continent, including Canada, Greenland and Antarctica. Canada is not a member of the Pan Amer Union, a signatory of the Act of Chapultepec, or a



RIO DE JANEIRO

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prov. of Brazil and its forests are rich in timber. Its soil, which is rich and fertile, is very extensively cultivated, the chief crop being coffee. It has a naval school and an arsenal. There is a naval dock yard at the Ilha das Cobras. Area 16,400 sq. m. Pop. 2,150,000.

Treaty of (1947), for the mutual defence of the Americas. Signed on Sept. 2 at Rio de Janeiro. It opens with a condemnation of war by the high contracting parties and a pledge not to resort to force in any manner inconsistent with the charter of the United Nations or the treaty itself. The parties undertake to endeavour to settle such controversies as may arise between them before referring them to the General Assembly or the Security Council of the United Nations. The vital Article 3 registers agreement that an armed attack by any state against an Amer state shall be considered an attack against all the

signatory of this treaty. Greenland is Dan. ter. and in 1949 the U.S.A. had not negotiated with Denmark an agreement concerning its defence. If the integrity, sovereignty or independence of any Amer state should be affected by aggression not amounting to armed attack or by any situation that might endanger the peace of America the Organ of Consultation shall meet at once to agree on the measures to be taken. This body is formed by the ministers of foreign affairs of the republics which have ratified the treaty, but the governing board of the Pan Amer Union may act provisionally pending the meeting of the Organ of Consultation. The treaty remains in force indefinitely, but may be denounced by any contracting party by notification to the Pan Amer Union and ceases to be in force in respect of that state two years after the notification has been received.

Rio de la Plata, see PLATA

Rio de Oro and **Adrar, N.** African colonial possessions of Spain, stretch S. along the coast from S.W. Morocco to Cape Blanco. They are under the governorship of the Canary Is. Dates and fish are exported. The cap., *Villa Cisneros*, is an air station. Area 105,000 sq. m. Pop. 32,000 (whites 850), exclusive of some 31,000 nomads who enter the area after the rainy season.

Rio Grande: 1. Riv. rising in the Rocky Mts., Colorado, and flowing through New Mexico and Texas to the gulf of Mexico. There is an irrigation dam at Engle, New Mexico, for Mexican use. El Paso, Texas, is the prin. tn. on the riv. Length 1800 m. 2. See *ARAGUAY*.

Rio Grande, seaport of Brazil in Rio Grande do Sul on the strait leading to the Lagoa dos Patos, 730 sea m. from Rio de Janeiro, and less than half that distance from Montevideo. It has a large harbour and is Brazil's most southerly port for ocean-going shipping. It is the distributing centre for the S. part of its state and exports dried meat, hides, and tobacco. There are cotton, woollen, and jute factories, an oil refinery, and fisheries. Pop. 60,000.

Rio Grande do Norte: 1. Riv. of Brazil, rising in the N. of Minas Geraes, and flowing westwards into the Atlantic at R. G. do N., or Natal. Length 450 m. 2. Atlantic state of Brazil in the N.E. Coclinoal, sugar, cinchona, coffee, cotton, tobacco, timber, and rubber are produced, and horses and cattle are reared. The cap. is Natal. Area 20,482 sq. m. Pop. 893,700.

Rio Grande do Sul, S.E. Atlantic state of Brazil, bounded on the W. by Argentina, and S. by Uruguay. It contains two large lakes, Lagoa dos Patos and Lagoa Mirim. The surface is grassy steppe in character, supporting vast herds of cattle; dried beef and hides are exported. Coal of inferior quality is mined, also wolfram, and copper, gold, agates, and amethysts are found. Agric. products include coffee, tobacco, rice, cereals, and sugar. Soap and textiles are made. The cap. is Porto Alegre. Area 109,067 sq. m. Pop. 3,863,800.

Rio Hacha, tn. of Colombia, in the prov. of Magdalena, standing near the base of the Gajira Peninsula, 100 m. E. of Santa Marta, both being on the Caribbean sea coast. The roadstead is open and shallow. There are pearl fisheries, and dealing in vegetable ivory, manioc fibre, and rubber. Pop. 10,000.

Rioja, delicate red wine of good flavour, produced in N. Spain.

Rioja, or **La Rioja:** 1. Andine prov. of Argentina, situated between Cordova, San Juan, and Catamarca. In the N.W. is the Sierra Famatina (20,000 ft.). Gold, copper, silver, and iron are found, and the soil is fertile in vines, maize, cotton, etc. Area 33,394 sq. m. Pop. 109,400. 2. Cap. of above prov., at the side of the Sierra Velasco at an altitude of 1670 ft. Pop. 15,000.

Riom, tn. of France, in the dept. of Puy-de-Dôme, 115 m. S. of Paris, with linen and tobacco factories, and trade in

wines and corn, etc. It has many quaint buildings, including the fourteenth-century church of S. Chapelle, formerly a château owned by the dukes of Auvergne, and the fifteenth-century church of Notre Dame de Marthuret. At R., in Feb. 1942, the Fr. Vichy Gov. began the trial of the politicians and soldiers alleged to be responsible for the defeat of France, the trial being suspended when Laval came to power.

Rion (anc. *Phasis*), riv. of Transcaucasia, with a course of 200 m. from the S. slopes of the Caucasus to Poti on the Black Sea. Its link with the voyage of the Argonauts gave it fame in antiquity.

Rio Negro: 1. Riv. of Argentina (see *NEGRO*, *Rio*). 2. Riv. of S. America (see *NEGRO*, *Rio*). 3. Ter. of Argentina in N. Patagonia, adjoining the Chubut Ter. on the N., and bounded by the R. Negro on the S. It is mainly plateau and has been made fertile by irrigation. Alfalfa and cereals are grown, and cattle are reared for stock. Viedma is the cap. Area 77,610 sq. m. Pop. 139,600. 4. Dept. of Uruguay, bounded by the Negro on the S. and the Uruguay on the W. Cereals are grown and stock are raised. Fray Bentos is the cap. Area 3270 sq. m. Pop. 47,600.

Rio Pardo, tn. in Rio Grande do Sul, Brazil, 76 m. W. of Porto Alegre. Pop. about 35,000.

Rios, or **Los Rios**, inland prov. of Ecuador, W. of the Andes. Cap. Babahoyo. Area 2295 sq. m. Pop. 150,800.

Riot, generally defined as a tumultuous disturbance of the peace by three persons at least, assembling together of their own authority with an intent mutually to assist one another against any who shall oppose them while engaged in the execution of some enterprise of a private nature, and afterwards actually executing the same in a violent and turbulent manner to the terror of the people. It is immaterial whether the object of the rioters be lawful or unlawful, the whole gist of the misdemeanour being the unlawful manner of proceeding, namely with circumstances of force and violence. By the Riot Act, 1714, a justice of the peace, sheriff, or mayor may, where the rioters number twelve or more, require them by proclamation (called reading the Riot Act) to disperse; if the rioters continue together after the lapse of one hour from the reading of the Act, they are guilty of felony and liable to penal servitude to the extent of life. Similarly, it is a felony to oppose the reading of the Act. Prosecutions under the Act must be begun within twelve months after the felony. Under the Riot Damages Act (1886) the local police authorities can be sued for damage done during a riot.

Rio Tinto (Minas de Rio Tinto), tn. in the prov. of Huelva, Spain. It is one of the greatest copper-mining centres in the world, with an ann. yield of over 1,000,000 tons of iron pyrites. Pop. 12,000.

Riouw-Lingga, or **Riau-Lingga**, archipelago composed of two groups of is. of Indonesia, lying S. of the Malay Peninsula, from which they are divided by the

straits of Singapore. It formed, before 1950, with Karimon, Anambas, Natuna Is., Tambelan, and the ter. of Indragiri in Sumatra, the residency of Rlouw and dependencies. The seat of government is Tanjong Pinang, on the is. of Rlouw or Bintang. Pepper, gambier, and rubber are cultivated, and tin and bauxite mined. Area 12,506 sq. m. Pop. 298,200.

Riparian Rights, see RIVERS, *Law Relating to Rivers*; *Riparian Rights*.

Ripley: 1. Mkrt. tn. and urb. dist. of Derbyshire, England, 10 m. N.N.E. of Derby. The tn. has coal-mines, iron-foundries, textile manufs., boiler works, etc. Pop. 18,000. 2. Vil. of Surrey, on the R. Wey, 5 m. from Woking. It was important in coaching times. Pop. 3000. 3. Vil. of Yorkshire on the Nidd, 3 m. from Harrogate. R. Castle dates from the sixteenth century, but has been modernised. Cromwell stayed there before Marston Moor. Pop. 200.

Ripon, Frederick John Robinson, Viscount Goderich, afterwards first Earl of (1782-1859), politician, b. in London. He entered the House of Commons in 1806, was chancellor of the exchequer from 1823 until 1827, in which year he became secretary for war and leader of the House of Lords. On Canning's death (1827) he was Prime Minister, but resigned in the following year. In 1830 he was again secretary for war. In 1833 he was created earl of Ripon, and held the offices of president of the Board of Trade (1841) and of the Board of Control for Indian Affairs (1843-46). He was an inept politician and a weak Prime Minister, but had some financial ability.

Ripon, George Frederick Samuel Robinson, first Marquis of (1827-1909), Eng. statesman, b. in London. He entered Parliament in 1853, and during the Palmerston administration became under-secretary for war (1859), under-secretary for India (1861), secretary for war (1863), and secretary for India (1866). Under Gladstone he was appointed president of the council (1868). He was chairman of the High Joint Commission on the *Alabama* claims (1871), for which he received his marquessate. Gladstone appointed him viceroy of India in 1880, and though his administration was fiercely criticised in England, he was very popular with the native pop. Later he was First Lord of the Admiralty.

Ripon, city and municipal bor. on the Ure in the W. Riding of Yorkshire, England, 24 m. N. of Leeds. The present cathedral dates from 1151 to 1520, and was restored by Scott in the nineteenth century. This building replaced an earlier structure, of which the seventh-century crypt remains. Other buildings of interest in R. include the Norman chapel of St. Mary Magdalen, the old almshouses, and the eighteenth-century tn. hall. Studley Royal and Fountains Abbey (q.v.) are near by. The bishop's palace is outside the tn. R. was once famous for its cloth and its spurs. Paint and varnish is now the chief local manuf. and there is trade in agric. produce. The city grew up round the abbey, which was founded

by missionaries in the seventh century. The first abbot was St. Wilfrid, to whom the cathedral is dedicated. The tn. became famous for its markets and fairs, which belonged to the archbishop of York and the eccles. commissioners until 1800. The wakeman remained the leading official until the seventeenth century. An old custom which still persists is the blowing of a horn in the market square every evening at nine o'clock. In 1640 Charles I. made the treaty of R. here with the Scots. The collegiate church became a cathedral in 1836. Pop. 9300.

Ripon Falls, on the Victoria Nile, in Uganda, where the riv. emerges from Lake Victoria. They were discovered by Speke on July 28, 1862. They are only about 15 ft. high, but between them and the rapids known as the Owen Falls (q.v.), a distance of 3 m., the Nile Bridge (combined road and rail) crosses the riv., and from the bridge a fine view may be obtained of the broken water of the riv., and the rugged scenery of its banks. Viewed by the pedestrian from the riv. the most impressive feature of the falls is the great rush of water over their verge, and, though not remarkable for their height, it is possible from the railway bridge to see their full expanse, which is not usually obvious from the bank. The R. F. are notable for fishing; the Nile immediately below the falls at Jinja contains a very large supply of barbel (*Barbus altianalis radcliffei*).

Ripponden, tn. of the W. Riding of Yorkshire, England, 5 m. S.W. of Halifax. It manufs. cottons, woollens, silk, and paper. Pop. 4900.

Riqueti, André Boniface, Honoré Gabriel, and Victor, see MIRABEAU, COMTE DE.

Risca, tn. of Monmouthshire, Wales, 6 m. W.N.W. of Newport. It is engaged in coal-mining and the manuf. of chemicals and tinplate. Pop. 15,100.

Rise, see under MINING.

Rishis: 1. 'Seers,' name given to the sons of Brahma, poets of the Vedic hymns, representing the families of Gritsamadas, Kusikas, Vamadevyas, Atris, Bharadvajas, and Vasishthas. The title was later given, with the significance of semi-divine, to men who had given up temporal power for an ascetic life. 2. In astronomy the constellation of the Great Bear.

Rishton, tn. of Lancashire, England, 3 m. N.E. of Blackburn, engaged in coal-mining and the manuf. of paper and cotton. Pop. 6300.

Risinge, vil. in the prov. of Ostergötland, Sweden, 22 m. N. of Linköping. Pop. 8000.

Rispetto, type of old It. improvised folk-poem of six to ten (usually eight) inter-rhyming lines, sung to popular tunes.

Ristori, Adelaide (1822-96), It. actress, b. at Cividale del Friuli. She became attached to the company of actors organised by Mascherpa for the duchess of Parma. She travelled in France, England, Belgium, Austria, and Germany, and played many important roles, challenging Rachel's supremacy. Her

portrayal of Lady Macbeth was one of her most successful parts on the stage.

Rita, pseudonym of Mrs. Desmond Humphreys (*née* Gollan) (d. 1938), Eng. novelist, b. in Gollanfield, Inverness-shire, educated in Australia, and travelled considerably. Her works include *A Husband of no Importance* (1894); *Peg the Rake* (1894); *The Sinner* (1897); *Souls* (1903); *Queer Lady Judas* (1905); and *The House called Hurriah* (1909).

Ritardando (It. *retarding*), musical term, indicating that the time should be slackened. It is usually abbreviated in MSS. to *rit.* The same direction is also expressed by *rallentando* (slowing down) or *ritenuto* (holding back).

Ritchie, Charles Thomson, first Baron Ritchie of Dundee (1838–1906), Eng. politician, b. at Dundee. Educated at the City of London School, he became partner in his father's office (jute spinner). R. became Conservative M.P. in 1874, representing successively Tower Hamlets, St. George's in the East, and Croydon. He is chiefly remembered for introducing the Local Government Act, 1888, and for his two Public Health Acts of 1891. He sat with the Conservatives, but his ideas were too progressive for many of his colleagues. His reputation was brought about by Joseph Chamberlain's attitude on tariff reform, the latter objecting to R.'s abolition of the corn duty.

Rite, see **RITUAL**.

Ritornello (It. 'little return'), originally a refrain and hence, in the early seventeenth century, a recurrent instrumental piece played in the course of a musical stage work; later the instrumental passages between vocal portions of an anthem or aria, from which in turn is derived the meaning of the word R. as applied to the orchestral *tutti* in concertos, especially in rondos where the same theme returns sev. times.

Ritschl, Albrecht (1822–89), Ger. Protestant theologian, b. at Berlin. He lectured on theology at Bonn (1852–59) and at Göttingen (1859–89). His early work showed the influence of the Tübingen school in directly reflecting the teaching of Baur, as in *Das Evangelium Marcions und das kanonische Evangelium des Lukas* (1846). The second ed. of his *Die Entstehung der altkatholischen Kirche* (1857) showed that he had considerably modified his views. In 1864 R. came under the influence of Rudolf Lotze, and explained his system of theology in *Die Christliche Lehre von der Rechtfertigung und Versöhnung* (1870–74). See L. Stählin, *Kant, Lotze, and Ritschl* (Eng. trans., 1889); A. E. Garvie, *The Ritschlian Theology*, 1899; J. Orr, *Ritschlianism*, 1903; R. Mackintosh, *Ritschl and his School*, 1916; and studies by A. von Harnack, 1922; C. Stange, 1922; and E. Vischer, 1922.

Ritter, Karl (1779–1859), Ger. geographer, b. at Quedlinburg, was appointed prof. of geography at Berlin in 1820, and lecturer at the military school. R. was one of the first to make a wide comparative study of geographical science. His chief work is *Die Erdkunde im Verhältnis*

zur Natur und zur Geschichte des Menschen (10 vols., 1822–59). See life by W. L. Gage, 1887.

Ritual (Lat. *rituale*), generic name for all the outward ceremonies of religion as distinguished from private exercises of devotion, meditational prayer, etc. The word is, however, most frequently used in a more restricted sense for certain medieval and post-medieval books containing directions for the administration of the Sacraments and similar priestly functions. Originally all such directions were contained in Sacramentaries. In the eighth century the rites peculiar to bishops were taken out and formed the Pontifical; likewise the directions and rites for the Mass formed the Missal; much later in the sixteenth century the R. was formed of what was left. The first official Rom. R. was pub. by Pope Paul V. in 1611. The Orthodox call their R. the *Ευχολογιαι*, Eucharologion. The R. (in the broad sense) of the Anglican Church is largely traditional, but the Book of Common Prayer contains some directions. See also **LITURGY**.

Ritualists, name given to those who were influenced by the Oxford Movement, which was due to the work of such leaders as Keble, Newman, Pusey, Froude, and others. A quotation from the *Contemporary Review* for Oct. 1874 may assist in forming an unbiased opinion regarding the justification for this movement. W. E. Gladstone said: 'It must be admitted that the state of things from which the thing popularly known as ritualism took historically its point of departure, was dishonouring to Christianity, disgraceful to the nation, disgraceful most of all to that much-vaunted religious sentiment of the English public which in impenetrable somnolence endured it, and resented all interference with it. . . . The actual state of things was bad beyond all parallel known to me in experience or reading.' He goes on to enlarge on the baldness of the services, the horrors of the so-called music, the coldness and indifference of the lounging or sleeping congregations, and concludes by describing the services as 'probably without parallel in the world for their debasement.' With the revival of sacramentalism there arose the desire for more ornate ceremonial, but violent opposition to the movement was met with wherever the new ritual was introduced. In 1847, when the Rev. John Mason Neale took up work as warden of some old almshouses at E. Grinstead, the bishop of Chichester inhibited him. It was known that he had placed a cross, candles, and flowers on the altar of the restored chapel of Sackville College, and the inhibition remained for fourteen years. The Public Worship Regulation Act, 1874, failed to curtail the activities of the clergy who were drawn into the movement, and sev. of them were imprisoned for refusing to obey the orders of the courts. Amongst these were Arthur Tooth, T. Pelham Dale, R. W. Enraght, S. F. Green, and J. Bell Cox. By the 1874 Act a layman was made the official principal of a new arches court instead of the judges who had previously

been appointed by the archbishops of Canterbury and York in their prov. courts of arches. In 1875-76 this court decided against an offending clergyman, but when he appealed to the higher court it made some modifications in the decrees of the court of arches, the jurisdiction of which many clergy refused to recognise, preferring to go to prison. It is interesting to know that in 1869, before the reform in the court of arches, it was decided there, in the famous Purchas case, that the ornaments of the churches and vestments of the clergy, mentioned in the First Prayer Book of Edward VI., were allowable, but the Judicial Committee of the Privy Council on appeal reversed this decision. The decision of the latter court was then, and has been since 1869, openly disregarded by many of the clergy, and at present (1950) most bishops are extremely reluctant to take proceedings against their clergy on the grounds of ritualistic practices or even doctrinal matters, unless the latter are of very serious nature. The agitation against ritual that was once very violent has now largely subsided, and toleration has replaced suspicion and opposition.

Riu-Kiu Islands, see **RYUKYU**.

Riva, tn. and seaside resort in the Trentino, Italy, at the N. of Lago di Garda. There are some fine medieval buildings. The chief manuf. is silk. Pop. 11,000.

Rivarol, Antoine (1753-1801), Fr. author and wit, the son of an innkeeper, b. at Bagnols in Languedoc, assumed the title of Comte de R. He came to Paris in 1777, and was soon celebrated for his mordant wit and biting sarcasm; on the outbreak of the revolution he emigrated. Amongst his works are *Sur l'Université de la langue française* (1784) and *Dictionnaire des grands hommes de la révolution* (1790), but his talent was exhibited to the best advantage in conversation and impromptu witticisms.

Rivaux Abbey, see **RIEVAULX**.

Rive, Auguste de la, see **LA RIVE**.

Rive-de-Gier, tn. in the dept. of Loire, France, 13 m. N.E. of St. Etienne, on the R. Gier and canal. It produces silk, glass, steel, iron, and coal. Pop. 13,900.

Rivera, Diego (b. 1886), Mexican painter, b. at Guanajuato. He studied art in Spain, France, and Mexico. His most outstanding work appears in his frescoes, where his portrayal of historical subjects shows a treatment owing much to ant. Mexican folk-art. See life by B. D. Wolfe, 1939, and *The Frescoes of Diego Rivera*, 1929.

Rivera, Miguel Primo de, see **PRIMO**.

Rivera: 1. N.E. dept. of Uruguay. There is much cattle breeding, and gold is mined. Area 3793 sq. m. Pop. 75,500. 2. Cap. of the above, 130 m. E. by N. of Salto, on the Brazilian frontier. It is the N. terminus of the Central Uruguayan Extension Railway. It produces cattle, tobacco, and fruits. Pop. 23,000.

River Engineering comprises the works necessary (1) to regulate the flow of water by aiding the discharge of flood water and maintaining the flow in dry seasons; (2) to prevent or control the natural erosion of

banks; (3) to preserve or construct navigating channels, or canalise the riv.; (4) to utilise the waters for purposes of irrigation; (5) to arrange lateral reservoirs, docks, and wharves, and, in general, prevent destructive action and render the riv. useful to man's industry, or in the physical sense to remedy the grading of an immature riv. Flood waters may be more rapidly discharged by deepening the shallow fords and cataracts, or blasting away rocky bed or cliff; by forming new cuts from curve to curve, straightening the course and increasing gradient; by regulating drainage of parts of its area, and leading the collected water into suitable portions of the riv., or by cutting extra channels. The water when scarce can be retarded in its flow by constructing weirs or regulating drainage, by embanking portions where the gradient is almost lost. In most rvs. works of both kinds are necessary and must be mutually accommodated; weirs must be capable of adjustment to different levels. In many cases old bridges with narrow arches and heavy piers have to be removed or reconstructed. Embanking is usually the first remedy, as it fixes the course of the stream; it may be of massive masonry, of logs of wood fixed horizontally above the other, of cement blocks laid down in sacks and hardened by the water, of loose rock or piled blocks of stone. Often hurdles or fagots will serve well, or loose earth embankments, afterwards bound by suitable planting and tended from time to time. Floods, however, help to maintain the channel of a riv. by depositing silt over surrounding country rather than in the bed of the lower course where it would decrease gradient, and embanking increases the silting up of lower reaches. In the flood plains of mature rvs. embanking needs continual increase, and the natural tendency of the riv. to raise its bed is aided, with danger of bursting its banks and inundating the plain. The remedy is to supplement the banking by continuous dredging and straightening the channel, by building sufficiently high and strong embankments, and by placing them well beyond the natural banks, leaving a flood foreshore. It is also important to prevent encroachment by wharves or buildings; these should be set well back and served by docks and water channels. Where possible lateral reservoirs or lakes, or unoccupied and unproductive low land, may receive flood waters. As a last resort with very old rvs., in lands practically at sea level, pumping by windmills or other economical means is adopted.

Weirs are dams with adjustable sluice gates or sliding doors arranged across them; sometimes it is sufficient to build them solid and allow flood waters to flow over them; they may also be arranged as steel plates in grooves, so arranged as to leave the cross-section of the stream quite free in flood time, as at Richmond-Thames. A system of weirs divides a riv. into a series of almost horizontal layers, in each of which a navigable depth is maintained.

Locks are necessary concomitants of weirs in navigable rivs., to allow the raising or lowering of vessels from one reach to another. They are often arranged in a new cut, but the occurrence of an is. may afford a suitable site for lock and weir.

Tidal Portions of Rivers are best regulated by dykes built longitudinally, but jetties thrown out at intervals tend to keep a central channel, though they form difficult shoals and currents. They are not as good as cross dykes, which serve to protect the longitudinal ones from being taken in the rear, and also protect the land beyond. The longitudinal dykes are usually formed of cement or rough stones carefully adjusted and known as *training walls*. They are usually carried out with careful preservation of the funnel-shape of a good estuary and are prolonged into deep water to preserve current. They diminish the scouring action of the tide by limiting the amount of water passing up-channel, but they locate more definitely the shoals and sand-banks and carry them further out to sea, thus simplifying dredging operations. Liverpool is fortunate in having its estuary bottle-necked, a form of natural training. See also CANALS; DREDGING; DOCKS. See J. Stevenson, *Canals and River Engineering* (3rd ed.), 1886; L. F. Vernon-Harcourt, *Rivers and Canals* (2nd ed.), 1896; R. C. R. Minikin, *River and Canal Engineering*, 1920; C. McD. Townsend, *Hydraulic Principles of River and Harbour Construction*, 1922; H. and F. Shenton, *River Work*, 1935; F. Johnstone-Taylor, *River Engineering*, 1938; and F. Eyre and C. Haddfield, *English Rivers and Canals*, 1945.

River Fisheries, see FISHERIES.

River Hog, ungulate mammal, *Potamochoerus*, found in W. African forests, and also called the Red Bush-pig. It is red in colour, with a short, smooth coat, and is usually about 2 ft. high.

River Horse, see HIPPOPOTAMUS.

Riverina, dist. of New S. Wales, Australia, situated in the W. of the state, between the Murray and Darling. It is particularly noted for its fine and extensive sheep-grazing grounds; wheat is grown, and here the Murray red gum is found. The prin. tns. are Hay and Deniliquin.

River Police (London), see under POLICE.

Rivers, Anthony Woodville, or Wydeville, second Earl (1442-83), eldest son of the first earl. Known first as Lord Scales, and a famous joustier, he became earl when his father and brother were executed by the king-maker, 1469. Uncle to the Prince of Wales (Edward V.), he became his guardian in 1473. When Edward IV. died, R., at Northampton, met the protector (Gloucester (afterwards Richard III.)), who arrested him and had him executed at Pontefract on June 25. His *Dictes and Sayings of the Philosophers*, a trans. from the Fr., was the first dated book to come from Caxton's printing press (March 18, 1477).

Rivers, August Henry Lane Fox Pitt-, see FITT-RIVERS.

Rivers, Richard Savage, fourth Earl (2nd creation) (1680-1712), second son of the third earl, nicknamed 'Tyburn Dick' for robbing his miserly father. After the death of his elder brother, c. 1680, he was called Viscount Colchester. In 1681 he was M.P. for Wigan and nine years later he fought the Jacobites in Ireland. He succeeded to the earldom in 1694, and became general of horse in 1708. When Marlborough's downfall was imminent R. changed sides. He was Constable of the Tower in 1709, and master of the ordnance in 1711. See also SAVAGE, RICHARD.

Rivers, Richard Woodville, first Earl (d. 1469), after being esquire to Henry V., was made governor of the Tower by Henry VI. in 1424, and knighted in the following year. He took part in the war in France and in the Wars of the Roses, at first on the Lancastrian side. He married Jaquetta of Luxembourg, widow of the duke of Bedford, and subsequently the marriage of his daughter, Elizabeth, with Edward IV. caused him to join the Yorkists. Edward made him constable of England, Baron R. in 1448, and Earl R. in 1466. He was beheaded in 1469, after King Edward's defeat at Edgecot.

Rivers form a link in the circulation of the hydrosphere. The moisture precipitated from the atmosphere, after percolating through the ground, collects and finds its way to the surface (see SPRINGS), or, if solid, as in mountainous regions where it collects as snow, forms glaciers which melt on reaching the warmer regions, again affording a surface origin. In both cases the source commences a natural drainage channel, and by the union of these drainage areas are formed, with a main riv. and tribs. Each channel has its own drainage area and the line bounding it is the water-divide. Most drainage areas have an outlet to the ocean, but in some, known as inland drainage areas, the channel or channels empty into salt lakes or by evaporation even cease to exist; such areas exist in the great dry regions of the continents, e.g. the Rs. Amu-Darya and Syr-Darya (Aral Sea), Helmund and Murghat of Seistan, Jordan, many in the Sahara, central Australia, W. S. Africa, Argentina, W. U.S.A. Some rivs., e.g. Indus, Tigris, and Euphrates, Nile, Orange, Murray-Darling, Colorado, succeed in crossing dry areas, with diminution of volume; they are fed with rains outside the areas and gain an ocean outlet, but are not, or only with difficulty, navigable. The normal or typical riv. may be considered as flowing perennially with slight variation of volume, due to minor fluctuations of rainfall either in season or in distribution over the drainage area.

Characteristics of a Normal River.—The main channels of a riv. may be regarded in its distinctive portions as (1) torrential, (2) middle course, (3) lower course, (4) estuary. These arbitrary divs. correspond to variation of gradient. No sooner is land elevated above the surface of the ocean than forces are at work to reduce it again; of these erosion by rivs. is the greatest. 'Young' rivers soon work a

short torrential course to the sea, with narrow ravines, cataracts, and waterfalls. The life-like behaviour of rivers is complete in every aspect; the main object being to produce a definite gradient whereby its course is least obstructed (*see diagram*); in this activity it is not merely destructive, but constructive. Over hard strata falls gradually deepen, undermine, and work back forming gorges; along the reaches a



steadier, less vigorous erosion wears down a channel, while in the more level regions the accumulated sand, mud, and pebbles are deposited, raising the bed. These differently applied forces tend to produce the more uniform gradient shown in the diagram. The term 'graded river' is applied to one which has largely attained this state. On more level stretches, where the velocity is less, not only is material deposited, but every obstruction has an effect in deflecting the river laterally, producing meanders. These, by the action of the current moving from side to side, undercutting the outer bank and depositing alluvium on the upper bank, often become so accentuated that the river cuts through the narrow neck of land separating them, leaving an ox-bow lake. At this stage the river is constructive, depositing fine mud; its banks are above the level of the surrounding country, which is naturally fertile and well watered, and often in the case of large rivers, densely populated. A breach in the bank may then cause immense destruction. The lower Mississippi has experienced many disastrous floods. The less the velocity of the current, the greater is the amount of mud, sand, and mineral salts deposited along the course of the river. The Mississippi is calculated to throw out at its mouth every year 6,700,000,000 cub. ft. of suspended silt, 750,000,000 silt dragged along the bed, and 1,400,000,000 dissolved mineral salts. Such carrying away of earth material represents a lowering of the surface over the drainage area of a foot in periods of 500 to 10,000 years. Rivers formed before geological disturbance has elevated the land along their courses are known as antecedent rivers, those consequent to the uplifting of an area, consequent rivers. Often a river develops a tributary, or subsequent river, which in turn can develop its own tributaries, or obsequent rivers. Rivers not only extend their length at the mouth by depositing alluvium, but also 'eat backwards' from their source; the rate at which this occurs varies with the hardness of the geological formation of the area, and sometimes by this development a river can capture the waters and drainage area of another. With submergence of shore lines and the formation of floods, etc., a river and its tributaries may be separated; the resulting streams are known as dismembered rivers. Underground rivers may be caused by faulting, but they occur generally in regions where the rocks are highly soluble.

Relation to Rainfall.—The rainfall is not all discharged by the river. Much is evaporated and much goes to maintain the general level of ground water, which is utilised by the vegetation. The occurrence of lakes as part of the drainage system regulates the flow, while lateral lakes in old rivers, or dry areas may store flood water. The Nile has two distinct floods, due to contributions at different times from the Abyssinian and the equatorial mountains (*see also WATER SUPPLY*). The following rivers have a length of over 3000 m.: Amazon, Congo, Mississippi-Missouri, Murray-Darling, Nile, Yangtze; 3000–2000 m.: Amur, Irtysh, Lena, Mackenzie-Peace, Madeira, Mekong, Niger, Ob, Paraná, Volga, Yellow R. (Hwang-Ho), Yenisei, Yukon; 2000–1500 m.: Brahmaputra, Danube, Euphrates, Ganges, Indus, Nelson, Orinoco, Paraguay, Purus, Rio Grande, St. Lawrence, Salween, São Francisco, Si. Syr-Darya, Tocantins, Ural, Yapura, Zambezi.

Law Relating to Rivers: Riparian Rights.—The banks of a river, and the bed up to the middle line belong to the owners of the land on either side, and rivers and streams are private property. There is no right to the public of a low-path even along navigable rivers, but in all the above cases public rights are acquired by statute or by prescriptive possession or use. Private rights are held subject to non-interference with benefits held by owners of other parts of the river; the level of water may not be sensibly altered; any alteration or strengthening of banks must not deflect the current to the injury of other owners. Certain communal rights to water, deflection, etc., have been acquired by prescriptive use. In the curves of streams defensive embankments may be erected; the middle line in all gradual alterations remains the boundary, accretions on the inside of the bend adding to the property of the owner on that side; where sudden changes occur, the old middle boundary remains. In case of impounding or deflection under statutory powers, full purchase of right must be made or proportionate compensation paid. Fishing is private, and may not be acquired by custom or prescriptive use. The rights of fishing and navigation are public in the tidal portions of rivers, the bed being Crown property with a boundary at high-water mark; beyond that, private rights are exercised as in the river above tide-end. A channel when formed suddenly affords public rights of navigation at once, but the bed remains to the former owner.

Conservancy.—In the case of certain important rivers, conservators are appointed by Acts of Parliament to regulate and protect navigation and exercise the rights of the Crown for the public. By-laws are made, dredging and embankment carried out, locks and weirs established, and tolls taken, which must be expended in the public interest. Works are carried out to regulate floods, but the conservators are not liable in the case of injury due to 'natural causes.' Under various fishery Acts the control of waters containing char, trout, or salmon may be vested in con-

servancy boards, the fishery dists. being established by quarter sessions under power granted from the Home Office.

Pollution of Rivers.—See under PUBLIC HEALTH.

See also RIVER ENGINEERING.

See E. Suess, *Das Anflitz der Erde*, 1885-88-92 (trans., *The Face of the Earth*, 1904-6); L. F. Vernon-Harcourt, *Rivers and Canals*, 1896; I. C. Russel, *Rivers of North America*, 1898; G. Pitt-Lewis, *Handbook of Thames River Law*, 1900; W. H. Hunter, *Rivers and Estuaries*, 1913; L. Dudley Stamp, *Britain's Structure and Scenery*, 1946; and J. W. Kompster, *Our Rivers*, 1947.

Riverside, co. seat of R. co., California, U.S.A. It is specially famous for its citrus fruit, the seedless orange being developed here. Portland cement is made. Here is one of the colleges of the univ. of California, for resident instruction and research. Pop. 34,700.

River Valleys, see under VAILEY.

Rivet, fastener resembling a bolt in shape. In its manufactured state before being driven it is a round shank with a formed head at one end. Rs. are made from a special round steel bar, which has been tested for its high tensile and shear stress values. The bar is heated to a red heat and passed through a machine fitted with hollow-shaped dies, which squeeze and cut the bar into the required shape and length of R. There are numerous shapes or types of R. head. Those in common use are snap (or round), cone, and countersunk; other shapes include flat, oval, button, globe, steeple, pan, and mushroom.

Riveting is a simple method of joining or fastening, dating back to very ancient times. It is used for a variety of purposes, principally in shipbuilding, bridge-building, boiler-making, steel erection, and aircraft construction. The types of joint most commonly used are the lap joint, i.e. when the plates or parts to be joined overlap each other, and the butt joint, i.e. when the plates or parts are aligned in the same plane, butted together, and bonded by a cover plate or butt strap. The joints are prepared for riveting by drilling or boring holes through the plates, and particular attention is paid here to the diameter and pitch (the distance from centre to centre of adjacent holes) of these holes. The actual riveting may be done with hot or cold Rs., using hand or machine riveting hammers. In the first case, of hand-riveting, a full crew, comprising three men and a 'boy' is usually employed—two hammermen, one holder-up, and a R. boy. The boy heats the R. in a portable hearth or furnace, and passes it to the holder-up who, having made sure that its surface is clean and free of oxide flaking, inserts it into the hole and presses on the R. with a tool called a dolly, or dolly-bar, which is capped or hollowed out to receive the R. head. The two hammermen, on the opposite side, immediately hammer down the protruding shank or shank point to form a tight joint. Machine riveting is used wherever practicable, and has

largely superseded the hand method. In this case the R. is inserted and pressed between two dies by hydraulic or steam pressure. Another method of R. driving, not widely used, is that of the explosive R., which is used in the main only in aircraft construction where the joint is complicated and difficult. The R. is drilled at the end, and a small explosive charge is fitted into the cavity. The R. is inserted into the parts to be joined, and an electrically-heated holding-up tool is held against the R. head. Heat is conducted through the R. to the charge, which fires at a given temp., and the explosion draws out the sides of the hollowed R., and forms a cup-shaped head.

Riviera, narrow strip of coast bordering the Ligurian Sea, extending from Toulon to Leghorn, round the gulf of Genoa. The W. part from Toulon to the It. frontier is known as the Côte d'Azur; from there to Genoa it is called the Riviera di Ponente, and from Genoa to Leghorn, Riviera di Levante. The Maritime Alps, which in France form the R.'s background, reach altitudes of nearly 6000 ft.; the It. Apennines are lower. In both cases, however, the mts. rise almost direct from the sea, sometimes leaving a narrow coastal plain. The dist. being thus protected on the N., and open to the S., enjoys a delightful climate, marred only by an occasional bitter wind, the mistral. The mild winters and the beauty of the surroundings attract many visitors, especially during the season, which is between Nov. and May. It is equally famed as a holiday resort and as a health resort for convalescents and those suffering from asthma, rheumatism, nervous disorders, etc. The best known of the numerous towns and vills, are Cannes, Antibes, Nice, and Mentone in France, and Bordighera, San Remo, Savona, Genoa, and Spezia in Italy. There is also the principality of Monaco, with its famous fn. of Monte Carlo. A railway skirts the coast from Fréjus to Spezia, and the celebrated Corniche Road, a remarkable piece of engineering, takes the same route. The vegetation is naturally rich and varied, and has been greatly augmented by imported trees and plants, e.g. palms, cacti, and aloes. Roses, carnations, violets, mimosa, etc., are grown for export and for perfumeries. The fishing industry is locally important. See G. Home, *Along the Riviera of France and Italy*, 1908; Sir F. Treves, *The Riviera and the Corniche Road*, 1921, and *A New Handbook to the Riviera*, 1930; and J. Sion, *La France méditerranéenne*, 1934.

Rivière, Briton (1840-1920), Eng. painter, b. in London, and educated at Cheltenham and Oxford. He became an R.A. in 1881, having attained special fame as a painter of animals. Among his best-known works are 'The Empty Chair', 'The Last of the Garrison', 'Charity', 'Curse' (1871); and 'Daniel in the Lions' Den' (1872).

Rivière du Loup, riv. of Quebec. It has its source in the N. of the prov. and flows into Lake St. Peter, near Fraserville, the lake really being part of the

St. Lawrence. Fraserville (*q.v.*) is sometimes called Rivière du Loup en Bas.

Rivoli: 1. Tn. in Piedmont, Italy, 8 m. W. of Turin, with two royal palaces and silk and macaroni manufs. Pop. 12,900. 2. Vill. of Venetia, Italy, in the prov. and 12 m. N.W. of the city of Verona. It was the site of a Napoleonic victory over the Austrians (1797), and of a struggle between the Austrians and Piedmontese (1848). The eighteenth-century castello was gutted in the fighting in Italy in 1945, though repairs were put in hand. Pop. 1900.

Rixdorf, see NECKÖLLN.

Riyadh, tn. of Saudi Arabia, 500 m. N.E. of Mecca, both tns. being caps. A walled tn., surrounded by date gardens, it is inhabited by Wahabi Muslims. Pop. 100,000.

Rizal Mercado y Alonzo Realonda, José (1861-96), Filipino patriot, b. in Calamba, Laguna prov., Luzon, of aboriginal Tagalog race. He attended the Jesuit school in Manila. He graduated from Madrid in 1882, and visited other European univs., becoming an accomplished linguist. In 1886 he pub. *Noli Me Tangere*—a novel exposing the tyranny of the Spaniards in his country, from which they drove him in 1887. In 1891 his *El Filibusterismo* appeared. This was a sequel to his former novel. In 1892, returning to Manila, he was arrested and banished to Mindanao. He was seized, 1896, while on the way to Cuba as physician in a yellow-fever epidemic, and was shot as a traitor at Manila.

Riza Shah Pahlavi (1877-1941), founder of the Pahlavi dynasty, the reigning house of Persia. He served from an early age in the Cossack brigade of the army, eventually becoming its colonel. Followed a *coup d'état* in 1921 when the brigade marched into Teheran unopposed, he became commander-in-chief. Soon afterwards he became minister for war and thenceforward he was the supreme ruler of Persia. Later he reorganised the army and then nominated himself Prime Minister (Oct. 31, 1923). The youthful Ahmad Shah was prevailed on to make a journey to Europe for his health, and presently fled to Paris. On Dec. 16, 1925, R. accepted the throne and was crowned the following year. A vigorous though despotic reformer, he set out to introduce W. methods and ideas; thus he reorganised the ministries and depts. of government, and brought about the emancipation of women. He also created a small air force and revived the small Persian Navy. But perhaps his most striking work was the construction of the 865 m. coast-to-coast trans-Iranian railway, declared open in Aug. 1938, at a cost of £30,000,000. Towards foreign powers R. maintained an aloof and independent attitude. When war broke out in 1939 he was deaf to Brit. and Russian warnings and his ministers temporised, with the result that he abdicated in favour of Mohammed, his son, when in 1941 the Russians and Brit. entered the country. See PERSIA, History.

Rize, prov. of Turkey on the Black Sea

coast, the cap. being of the same name. Pop. 172,100.

Rizzio, David, see RICCIO.

Rjukan, waterfall in Telemark, Norway, formed by the Maaselv, and having a fall of 805 ft.

Roach, or *Leuciscus rutilus*, species of Cyprinidae found in the fresh water of Britain and of Europe generally. Its lower fins are tinged with red and rather large scales. Allied to and very like dace and chub, the R. swims in shoals in rivers and lakes and is used as live-bait for jack-fishing.

Roads. Strabo states that Babylon possessed paved R. as long ago as 2000 B.C., and in anct. Greece R. were regularly and well maintained. The Romans were great road-makers, an art which it is thought they acquired from the Carthaginians, and relics of Rom. R. still exist in Britain. The latter were carriageways about 16 ft. wide, marked often, though not always, by two parallel ditches, the causeway between which was excavated to a firm foundation; the base course, about 9 in. thick, was of two courses of large flat stones with cement or rough concrete between them; above this came a 6-in. layer of lime concrete carrying a 6-in. layer of brick, broken pottery, or stones cemented together with lime mortar. The alignment, set out by smoke signals and accurate surveying instruments, was straight ('shotgun location') over hill and dale, changes of direction being made on hill-tops; in very hilly country a road sometimes followed the contours. The chief R. were planned on a strategic basis rather than for local convenience, and were very durable, but fell into disuse when the Romans left Britain, after which wheel tracks and bridle-paths took their place, no care being taken in the construction of these tracks. A law of 1285 enacted that when a wheel track or bridle-path became impassable, as was frequently the case in bad weather, another had to be made alongside it. In 1346 the first toll for highway repairs was levied in this country, but the first Road Improvement Act was not passed until 1523, up to which time R. and bridges were kept in repair by lords of the manor, or in default by religious communities. In 1750 road-making revived in both England and in France, although in U.S.A. it lagged behind at this time; in that country sundry states began to pass laws making state aid for road-making possible, until to-day U.S.A. leads the world in R. In Britain R. were very neglected as a consequence of the enormous development in railways in the last century, and did not revive on a really large scale until the coming of the motor-car at its end, since when they have gone ahead very greatly.

Construction.—Road-making in England is associated with the names of two famous civil engineers, Thomas Telford (from 1803), and James Loudon Macadam (from 1813). Telford used a hand-packed foundation of vertical stones 12 to 18 in. high, covered with 24-in. stone in a layer 4 to 6 in. thick above it, while Macadam

used such broken stone ('macadam') in both foundation and surfacing. Telford's system proved the best, and is still used. The layers of stone were rolled with a heavy steam roller, and the top finished to a camber sufficient to drain away surface water falling on the road. Fine-grained granite, dolerite, crystalline limestone, flint, or iron blast-furnace slag are used for road construction, the wearing surface of 2½-in. stone being slurried in with wet hoggin (clayey gravel), and when dried out sealed with refined road tar applied at the rate of about 1 gallon per 4 sq. yds. of surface, blinded with hard cubical stone chippings; this surface dressing has to be renewed every three to five years. An improved form of construction substitutes tar macadam (a form of macadam in which broken stone is coated with tar) for the older waterbound macadam wearing surface; extensive improvements have taken place in the use of bitumen (a by-product of crude petroleum) as binders. The oldest and most expensive form of bituminous road surface is that known as rock asphalt, in which bituminous limestone is ground into a fine powder, heated, and laid hot with smoothing irons to a finished thickness of 1 to 2 in.; mastic asphalt is a form of surface in which old rock asphalt is ground up, remelted, and mixed with bitumen and stone, run into cakes, the latter being heated on site and laid hot with wooden trowels; rolled asphalt is broken stone coated with bitumen and laid hot.

R. paved with blocks have been popular in the past, especially for heavy traffic, but have now been replaced in many cases by jointless surfacings of the asphalt type. Originally they consisted of stone blocks (setts) of granite, whinstone, or gritstone in random lengths, 5 to 7 in. deep and 3 to 4 in. wide, laid on foundations of hard core or of concrete, the joints being grouted with a thick bitumen or cement mortar; in time wood blocks came to be used in a similar manner, the timber being creosoted deal or Oregon pine of a depth of 4 or 5 in. laid tight jointed; wood paving was quieter than stone setts, but for various reasons is gradually being replaced by jointless surfacings. Footways are often surfaced with materials of the same type as those used in carriageways, but of lighter construction; in recent years concrete slabs have come into wide use for this purpose, the slabs being bedded on ashes or sand; formerly York stone was extensively used, but has tended to fall into disuse owing to cost. The edges of footways are defined by granite, whinstone, or gritstone kerbs 6 in. wide and 12 in. deep laid on a bed of concrete; for lightly trafficked R. concrete kerbs are widely used, and if properly made are quite suitable, though they are never of the same quality as natural stone kerbs.

Concrete is widely used for the construction of R., especially in dist. In the E. and S.E. of England where supplies of hard stone of suitable size for the construction of Telford bases do not exist. Concrete carriageways are 8 to 12 in. thick, and are laid in bays 10 to 20 ft. across, the

smaller bay being preferable; the joints between the bays being filled with bitumen. Concrete makes a good foundation for a black-top surfacing and lasts for years without surfacing on lightly trafficked R., such as on housing estates, but it is difficult to repair, is non-resilient, and cracks easily. It, on hill slopes are banked up with retaining walls, the drainage channel being on the verge against the hill, and the outlet may run beneath the road to the lower level. A longitudinal gradient should not exceed about 1 in 25 maximum, and should exceed 1 in 200 minimum; the camber depends on the type of surfacing (the smoother the surface the flatter the camber), but is usually about 1 in 36, except on steep hills. In open country the surface of the road is kept above that of the surrounding lands, since then drainage is facilitated. Water in the base of a road is fatal to continued long life, and must be avoided at all costs. In modern work sight distances of 500 ft. upwards are aimed at on arterial R., with curves of the greatest radius possible and super-elevation of the outer surface to counteract centrifugal force. In Germany the construction of the *Autobahn*, with its long, unbroken stretches, designed for the rapid movement of motor transport, produced many interesting forms of clover-leaf and fly-over crossings. On trunk routes in America these systems have been developed to an advanced stage to carry fast-moving, heavy traffic. During the Second World War steel mesh and perforated steel plate was used for the construction of R. and tracks at short notice. For the law of R. see HIGHWAYS; also ROAD SAFETY; RULE OF THE ROAD; TRAFFIC; TRANSPORT.

See D. C. Broome, *Testing of Bituminous Mixtures*, 1934; E. J. Elford and P. E. Spielmann, *Roadmaking and Administration*, 1934; R. H. and R. G. Knight, *Road Aggregates—their Uses and Testing*, 1935; H. J. Collins and C. A. Hart, *Principles of Road Engineering*, 1936; A. C. Hughes and P. E. Spielmann, *Asphalt Roads*, 1936; A. C. Hughes, W. G. Adam, and F. J. E. China, *Tar Roads*, 1938; B. H. Knight, *Modern Road Construction*, 1938; and C. W. Scott-Giles, *The Road Goes On*, 1946. See also Brit. Standards issued by the Brit. Standards Institution, London, and 'Road Abstracts' and technical reports issued by the Road Research Laboratory, Harmondsworth, Middlesex (H.M.S.O., London).

Road Safety. In Great Britain the number of deaths from road accidents rose steadily between the two world wars, reaching a total of 6645 in 1939. This increased to 9169 in 1941. The Ministry of Transport, in conjunction with the Royal Society for the Prevention of Accidents, then launched a nationwide R. S. campaign. As a result, the total number of road deaths in 1948 had been reduced to 4513. This was slightly exceeded in 1949 (4773), but this, apart from 1948, was the lowest total since 1926. The groups most affected by road accidents are child and adult pedestrians,

cyclists and their passengers, and motor cyclists.

A comparison of the totals of road accidents shows:

Year	Deaths	Seriously injured	Slightly injured
1947	4,881	35,697	125,621
1948	4,513	33,067	115,817
1949	4,773	43,410	128,596

The worst feature of road accidents has been the number of children killed and injured. Before the Second World War education authorities and teachers co-operated with the Royal Society for the Prevention of Accidents in an effort to reduce the figure of fatal child accidents, but in 1941 the total rose to nearly 1500. The campaign against child accidents was intensified, and by 1949 the total of fatal cases in this category had been reduced to 965, although over 38,000 children were injured.

In all kinds of accidents it is clear that the real cause in the majority of cases is the failure of the human element rather than of the machine or the road conditions. In the case of drivers causes of accidents have been excessive speed in the circumstances, carelessness at cross-roads, improper overtaking, careless reversing, etc. In the case of pedestrians most accidents are due to some form of 'heedless crossing.' The most important requirement for safe driving is the proper regulation of speed to the prevailing circumstances.

The Royal Society for the Prevention of Accidents has done invaluable work in impressing the gravity of the R. S. problem upon central and local government authorities and upon the general public. The society has put forward many suggestions for lowering the accident rate: its 'kerb drill' has been widely and successfully adopted. In March 1950 a national children's safety campaign was conducted under the society's auspices. This society deals also with the prevention of all other types of accidents, e.g. in industry and the home.

Road Town, cap. and only tn. of the Virgin Is. (q.v.), on the S.E. coast of Tortola. It is a port, and trades in fish, poultry, and vegetables. Pop. 700.

Road Traffic Acts, see under HIGHWAYS. **Roanne**, tn. of France, in the dept of Loire, on the Loire, which is navigable at this point, 54 m. W.N.W. of Lyons. It contains an old castle, a fifteenth-century church, and a new *hôtel de ville*. There are anthracite mines, and spinning and weaving manufs. Machinery is manufactured. Pop. 44,500.

Roanoke (formerly **Big Lick**): 1. City in Virginia, U.S.A., formerly in R. co., on the R. riv. in the Great Valley, 50 m. W.S.W. of Lynchburg. It became a city in 1884. Three years earlier, its pop. numbered only 700, and R. owed its prosperity to the Virginia Railway. An important railway centre, R. carries on stock-raising, mining, and tobacco-growing and has machine shops. It contains Virginia College and a sanatorium, and has mineral springs near by. Pop. 69,300. 2. Riv. of Virginia and N. Carolina, U.S.A., formed

by the Dan and Staunton Rs. Rising in the Alleghany Mts., it flows across the Appalachian valley and then S.E. out into the W. end of Albemarle Sound. Length 388 m., navigable to Weldon for steamers. There is a canal round the falls at Haffax.

Roanoke Island, is. of E. Dare co., N. Carolina, U.S.A., separated by Croatan Sound from the mainland. Raleigh attempted to settle the first Eng. colony in America here (1585-87).

Roaring, see HORSE (DISEASES).

Roaring Forties, nautical expression for regions S. of lat. 40° S., in the Southern Ocean, where heavy westerly winds prevail, which sometimes cause mariners to return to Europe by the Cape Horn route instead of by the Cape of Good Hope. The winds are known as *Brave W. Winds*.

Roasting, see under COOKERY.

Roasting (in metallurgy), see under METALLURGY, *Extraction Metallurgy*.

Roatan, or **Ruatan**, is. in the Caribbean Sea, opposite the coast of Honduras, Central America. Length about 20 m.; greatest width, 5 m. It was discovered by Columbus on his fourth voyage in 1502. It has been a Brit. possession since it was given up by the Mosquito king in the seventeenth century. The pop. are largely Eng. by ancestry, being descendants of pirates and mutineers who sought refuge there in the seventeenth and eighteenth centuries, and Eng. is the most widely spoken language. Pop. 4400.

Robartes Family, see RADNOR, EARLS OF.

Robber Council, see EPTICHES.

Robbery, forcible taking from the person of another, or in his presence, and against his will, of any money or goods to any value. The violence may be actual, or constructive, as by putting into fear by threats of any kind of injury, whether to the person, property, or reputation. The whole gist of this aggravated form of larceny is the force or bodily fear, though the degree of fear required to be proved to sustain a conviction necessarily varies with the circumstances: it is not necessary to prove that the fear actually existed at all, if it can be shown that the circumstances were such as to be calculated to induce fear. If there be actual physical force or violence, the offence is R., though there be no fear at all. In any case the force or fear must either precede or be synchronous with the stealing; therefore, if a pickpocket subsequently uses force to keep a stolen purse, his offence will not be R., but simple stealing from the person. The maximum punishment for R. is imprisonment for fourteen years.

Robbia, **Andrea della** (1435-1525), Florentine sculptor, nephew of Luca della Robbia (q.v.), b. at Florence. He was a sculptor of considerable merit, and worked at reliefs and medallions of the Madonna, and medallions of infants for the foundling hospital at Florence. R. was one of his uncle's most distinguished pupils, and in some ways perfected Luca's technique, and extended the use of enamelled terracotta reliefs. See M. Cruttwell, *Luca and Andrea della Robbia and their Successors*, 1902; and A. Marquand, *Andrea della Robbia and his Atelier*, 1922.

Robbia, Luca della (1399-1482), It. sculptor, *b.* at Florence. He early devoted himself to sculpture, though brought up as a goldsmith, and probably studied with Ghiberti. He is best known for his works in enamelled terra-cotta, called 'Robbia ware,' a valuable collection of which may be seen in the S. Kensington Museum, chiefly in the form of medallions. He also executed a beautiful series of bas-reliefs for the Cantoria in the Cathedral of Florence; the tomb of the bishop of Fiesole; and a bronze door for the sacristy of Florence Cathedral. His technique was improved upon by his successors, but the spiritual beauty of his work was never surpassed. *See* J. Cavallucci and E. Molinari, *Les Della Robbia*, 1884; M. Cruttwell, *Luca and Andrea della Robbia and their Successors*, 1902; and P. Schubring, *Luca della Robbia und seine Familie*, 1921.

Robe, *see* SURPLICE.

Robertes Men, *see* ROBERT'S MEN.

Robert I. (d. 1035), duke of Normandy, known also as *Robert the Devil*. He was the father of William the Conqueror, and the son of Richard II., duke of Normandy, whose sister Emma had married first Ethelred, king of England, and afterwards Canute. He governed his duchy well, securing it from the king of France and defeating all his rivals. When his son William was seven years old R. set out on a pilgrimage to Jerusalem. He died on his way home.

Robert I. of Scotland, *see* BRUCE, ROBERT.

Robert II. (1316-90), king of Scotland from 1371 to 1390, son of Walter Stewart and Marjory, only daughter of Robert the Bruce (*q.v.*). He acted as regent during the exile and captivity of his uncle, David II., and was most prominent during the latter's reign. In 1371 he succeeded David, and became the founder of the Stuart dynasty. His reign was troubled by feudal dissensions, and sev. barons, including the earls of Douglas, Mar, March, and Moray, made independent raids into England. The distress occasioned by these raids and their reprisals was very great; after the successful expeditions of 1384 and 1385 by John of Gaunt and Richard II. respectively, the Scottish completely routed the Eng. at Otterburn in 1388.

Robert II. (Curt-hose) (c. 1055-1134), eldest son of William the Conqueror, whom he succeeded as duke of Normandy. From 1074 to 1079 he was engaged in disputes with his father, which flared up into actual war in 1078 when he had to seek refuge in Flanders. All his life R. was an ineffective rebel, relying on feudal claims without giving proof of ability to discharge his feudal obligations and with little sense of political responsibility, though he seems to have been a competent soldier. R. fought both his brothers, William II. and Henry I.; but his capacity for endangering them was lessened by the haphazard, sporadic character of his attacks and by his continuous shortage of money. In 1106 R.'s quarrel with Henry became acute. A battle was fought

between them at Tinchebrai (*q.v.*) in which R. was taken prisoner. He remained in captivity till his death. By this battle, won by an Eng. army under Henry, Normandy was won back for England. William Clito, R.'s son, was at one time a claimant for the Eng. throne.

Robert III. (1340-1406), king of Scotland. He succeeded his father Robert II. in 1390. The war with England broke out again on the accession of Henry IV. in 1399. In Aug. of the following year, Henry entered Scotland at the head of a powerful army, and advanced as far as Edinburgh, which was, however, successfully defended by the king's eldest son, the duke of Rothesay. In the following year, however, Henry Percy (Hotspur) made a more destructive inroad as far as Preston in E. Lothian. In consequence of the successes of the Eng., attempts were made to arrange a peace between the two countries, but without success. R. was generally incompetent, the gov. being carried on by two of his brothers and his son David.

Robert Grosseteste (c. 1175-1253), Eng. scholar and prelate, *b.* at Stradbroke, in Suffolk, of humble parentage, and educated at Oxford and Paris. In 1221 he was made prebendary of Lincoln, in 1224 rector of the Franciscans at Oxford, and in 1235 bishop of Lincoln, a post which he held till his death. At Oxford he held a position equivalent to that held later by the chancellor. He had disputes with the Lincoln chapter, the Canterbury monks, and Henry III., opposing the latter's demands for one-tenth of the church revenues, whilst he quarrelled with the pope on the question of the granting of Eng. benefices to foreigners. R. was, however, a religious reformer of the most orthodox kind. He was a voluminous author, writing philosophical treatises, mathematical works, and books on agriculture and household economy. He was a keen Gk. scholar. His political ideas may well have influenced Simon de Montfort, who was one of his friends. *See* life by F. S. Stevenson, 1899.

Robert, Leopold (1791-1835), Swiss painter, *b.* at Les Epatures. He engraved in Paris, and later turned to painting. R. achieved a European reputation with his pictures of it. peasant life, which show marked classical and romantic influence. *See* life by D. Berthoud, 1911.

Robert of Brunne, *see* MANNING, ROBERT.

Robert of Gloucester, *see* GLOUCESTER, ROBERT OF.

Robert of Jumièges, *see* JUMIÈGES, ROBERT OF.

Robert of Molesmes, Saint (1018-1110), Fr. saint and monastic reformer, *b.* at Troyes. He became a Benedictine, and gave up his abbacy at St. Michael of Tonnerre to become superior of a hermits in the forest of Collans. In 1075 he migrated to Molesmes with this community. As it prospered he became dissatisfied with its standards of conduct, and twice left Molesmes. On the second occasion R. went, with SS. Stephen,

Harding, and Alberic, at Cîteaux, where they founded a monastery more in keeping with their strict ideals. This became the mother house of the Cistercian Order (q.v.). R. later returned to Molesmes at the earnest request of the monks, who appealed to Rome. See K. Spahr, *Das Leben des heiligen Roberts, eine Quelle zur Vorgeschichte von Cîteaux*, 1944.

Robert of Newminster, Saint (d. 1159), Eng. saint, b. in Yorkshire. He became a Benedictine at Whitby, but later went to Fountains Abbey (q.v.) where the stricter Cistercian rule was being followed. Newminster Abbey was founded from Fountains in 1137, R. being its first abbot and largely responsible for its successful foundation.

Robertson, Sir Hugh Stevenson (b. 1874), Scots musician, b. at Glasgow, founder-conductor of the Glasgow Orpheus Choir, estab. 1905. Under his guidance this body has performed throughout the Brit. Isles, in the U.S.A. and Canada, and in sev. European countries, and has estab. a world-wide reputation. Composer of many songs and part-songs, he has made a distinctive contribution to the culture of Scotland in the collecting, editing, arranging, and popularising of her folk-music and traditional psalm-tunes. For many years he has been one of the most popular of musical festival adjudicators. R. is the author of books on musical subjects, of plays, poems, and humorous sketches, and a prolific journalist-essayist.

Roberts, Sir Charles George Douglas (1860-1943), Canadian poet and author, b. at Douglas, York co., New Brunswick, and educated at Fredericton Collegiate and the univ. of New Brunswick. He was prof. of Eng. and Fr. literature at King's College, Nova Scotia, from 1885 to 1887, and of economics, from 1887 until 1895. He became associate-editor of the *New York Illustrated American* in 1897. In Britain he was best known for his *Some Animal Stories* (1921), but in Canada he was acclaimed as an outstanding poet and as the 'father of Canadian literature.' His work showed imagination and sensitivity, and he had a remarkable prose style. R. was a prolific writer, publishing many vols. of fiction, poetry, essays, and hist. They include *Odeon*, and *other Poems* (1880); *Arc: an Ode for the Shelley Centenary* (1892); *Around the Camp Fire* (1896); *A History of Canada* (1897); *Kings in Exile* (1909); *New Poems* (1919); and *Canada Speaks of Britain* (1941). He was knighted in 1935. See life by E. M. Pomeroy, 1943.

Roberts, David (1796-1864), Scottish landscape and figure painter. He was b. at Stockbridge, near Edinburgh, and apprenticed to a house decorator, employing his evenings in the study of art. He was scene-painter at Glasgow, Edinburgh, and Carlisle (c. 1820), and at Drury Lane (1822). He travelled widely in Europe, Africa, and Asia, bringing back numerous sketches. R.A. in 1841. His works include 'Rouen Cathedral' (1820); 'Interior of St. Stephen's, Vienna'; 'Church of St. Paul at Antwerp' (Tate Gallery); 'Interior of Seville Cathedral' (1834); 'The Pyra-

mids from the Nile' (1845). The Victoria and Albert Museum contains many pictures by him. See life by J. Ballantine, 1866.

Roberts, Frederick Sleight, first Earl Roberts of Kandahar, Pretoria, and Waterford (1832-1914), Brit. soldier, b. at Cawnpore, India, and educated at Clifton, Eton, Sandhurst, and Addiscombe. He entered the Bengal Artillery in 1851. He first saw active service in the Indian mutiny, in the course of which he won the Victoria Cross. He also served in Abyssinia; and on the outbreak of the Afghan war, 1878-80, he was appointed to command the Kuram div. of the army, with the rank of major-general. In 1879 he distinguished himself by forcing a difficult Afghan position on the peak of Peiwar Kotal, and by gaining the victory of Charasia. For these services he was created K.C.B. In the following year he was put in command of the force sent to Kabul. From Kabul he proceeded on his victorious march to the relief of Kandahar, and near the latter place he defeated Ayub Khan, Sept. 1, 1880. He was made a baron in the following year, and was then appointed commander-in-chief of the Madras army. R. was commander-in-chief of the forces in India from 1885 to 1893. He was promoted lieutenant-general in 1883, general in 1890, and field marshal in 1895. In December 1899 he was sent out to S. Africa to take command of the Brit. forces in the Boer war (see BOER WARS; SOUTH AFRICA, THE UNION OF, *History*). R. returned to England in Dec. 1900, and in the following year he was made an earl, and received a grant of £100,000 from Parliament. In the same year (1901) he followed Lord Wolseley as commander-in-chief. He held the office until its abolition in 1904. In 1905 he resigned his position on the Committee of National Defence to advocate in the country the estab. of a system of national military service. He pub. *The Rise of Wellington* (1895) and an autobiographical vol., *Forty-one Years in India* (1897). Until the outbreak of the First World War he was busy with his compulsory service campaign. He attended the first war council. Being appointed colonel-in-chief of the Indian contingent in France, he went there on Nov. 11, 1914, caught a chill, and died at St. Omer. See lives by Sir G. W. Forrest, 1914, and H. de Watteville, 1938.

Robert's Men, or Robberies Men, set of lawless rogues who were notorious for their outrages in the time of Edward III. They are named in an Act of that reign with 'wastours and drawlatches' as committing divers robberies and manslaughter. Their name may be derived from Robin (Robert) Hood.

Roberts, Morley (1857-1942), Eng. novelist, b. in London and educated at Bedford Grammar School and Owens College, Manchester. In 1876 he went to Australia, where he worked in the bush—chiefly with sheep and cattle, and on the Victorian railroads. In 1879 he returned to England, and was employed in the civil service. He travelled widely and

visited Texas, Iowa, California, Canada, the Sandwich Is., Samoa, Rhodesia, Teneriffe, Corsica, etc., his experiences greatly influencing his books. Pubs. include: *The Western Avernus* (1887); *Everyman's Library*, 1924; *Land Travel and Sea-faring* (1891); *A Son of Empire* (1900); *Thorpe's Way* (1911); *The Private Life of Henry Maitland* (based on life of George Glissing, 1912); *Followers of the Sea* (1923); *On the Earthquake Line* (1924); *The Serpent's Fang* (1930); *Women and Ships* (1931); *A Humble Fisherman* (1932); *Malignancy and Evolution* (new ed., 1934); *Bio-Politics* (1938); and *The Behaviour of Nations* (1941); also ed. two books by W. H. Hudson, *A Wind in Richmond Park* (1922) and *Men, Books, and Birds* (1925).

Robertson, Sir Brian Hubert, Brit. soldier and administrator, b. 1896, son of F.-M. Sir Wm. R. (q.v.). He served in the Royal Engineers in the First World War and was awarded the D.S.O. and M.C.; then served in the Waziristan expedition (1922-23) with the rank of major. On succeeding to the baronetcy he retired from the army (1933) and settled in S. Africa, where he became managing director of Dunlop (S. Africa) Pty., and joined the Union Defence Force. He accompanied the S. African troops to the Middle E., served in the Eighth Army, and became chief administrative officer to Gen. Alexander (q.v.) in Italy. After the armistice he was restored to the active list of the Brit. Army, and became deputy military governor, later (1947) military governor and commander-in-chief in the Brit. zone of Germany. With the end of military government there he was appointed high commissioner for the Brit. zone (a civil appointment). He was promoted lieutenant-general in 1946 and general in 1947. In March 1950 he was appointed commander-in-chief, land forces, Middle E., provisionally with effect from June of that year.

Robertson, Sir Charles Grant (1869-1948), Brit. historian, educated at Highgate School and studied at Hertford College, Oxford. In 1893 he became a fellow of All Souls, and was senior hist. tutor at Magdalen from 1905 till 1920. He was principal of Birmingham Univ. from 1920 to 1938 and chancellor between 1927 and 1938. He returned to All Souls as domestic bursar during the Second World War. He was a brilliant administrator, and his detailed pubs., such as *England under the Hanoverians* (1911), *Bismarck* (1918), and *Chatham and the British Empire* (1946), have become standard works. It was knighted in 1928.

Robertson, J. Forbes, see FORBES-ROBERTSON.

Robertson, Mrs. J. G., see RICHARDSON, HENRY HANDEL.

Robertson, Joseph Clinton, see under PERRY ANECDOTES.

Robertson, Sir Macpherson (1860-1945), Australian philanthropist, b. in Ballarat of poor parents. As founder of the Australian confectionery firm which bears his name, he became famous for his successful organisation of a large-scale manu-

facturing industry and also for the public-spirited use which he made of his wealth. As a boy he sold newspapers in the streets of Leith, Scotland, where his family lived for a time. Soon after his return to Australia he was apprenticed to a confectionery maker and later hawked his own home-made sweets for sale. From this modest beginning he soon developed a solid business. In 1923 he gave a large sum for the relief of suffering in the Jap. earthquake. Among R.'s numerous gifts to Victoria state was a large sum towards the expenses of the Australian Antarctic Expedition, 1929-30 (MacRobertson Land in Antarctica commemorates his name). In 1938 he financed and organised a 10,000-m. motor transport exploration expedition round Australia; in 1933 he gave £100,000 to the gov. of Victoria in connection with the centenary celebrations of 1934. R. initiated the air race from England to Australia.

Robertson, Thomas William (1829-71), Eng. dramatist, b. at Newark-on-Trent. He began as an actor, but it was as a writer of plays that he became famous. His first success was *David Garrick* (1864), and this was followed by *Society* (1865). Then came *Ours* (1866), *Caste* (1867), and *School* (1869), *Caste*, his greatest success, is revived from time to time, enduring largely by virtue of its admirable technique. His plays reflect faithfully the manners of his time. See life by T. E. Pemberton, 1893.

Robertson, Sir William Robert (1860-1933), Brit. soldier, b. at Welbourne, Lincolnshire. He enlisted at Worcester in 16th Lancers, 1877, as a private, and showed such promise that he was commissioned, and went to India in 1888 as 2nd lieutenant in 3rd Dragoon Guards. He rose to the rank of staff captain, and entered the Staff College at Camberley in 1897, being the first man from the ranks to do so. It was on the headquarters staff in S. Africa, and promoted lieutenant-colonel in 1900. He was appointed commandant of the Camberley Staff College in 1910. He was director of military training at the War Office from 1913 to 1914. R. went to France as Q.M.G. of the Brit. Expeditionary Force in 1914, and was chief of Imperial General Staff from 1915 to 1918. He was made a general in 1916. R. strongly opposed plans for the diversion of forces from the W. front to more distant theatres of war, and in Feb. 1918 was, shortly before the soundness of his judgment was proved by the success of the Gers. in France, superseded by Sir Henry Wilson, and given the E. command at home. He was commander-in-chief on the Rhine from 1919 to 1920, and was appointed field marshal in the same year. R. had been knighted in 1913 and made a baronet in 1919. In 1921 he pub. his autobiography, *From Private to Field Marshal*.

Robertson, w.-growing list. of S.W. Cape of Good Hope, S. Africa, forming part of the Little Karoo, intersected by Broads R. Irrigation is extensively practised. R., 80 m. N.E. of Cape Town, is the cap. Pop. 4600.

Robertson-Scott, J. W. (b. 1866), *see* under 'COUNTRYMAN, THE.'

Robes, Mistress of the, see HOUSEHOLD, ROYAL.

Robeson, Paul (b. 1898), Amer. actor and singer, b. in Princeton, New Jersey. His father was a Presbyterian minister there. A Negro, R. graduated with honours at Rutgers College, the majority of whose students are white, and became prominent in the football and baseball teams. He won the coveted distinction of being elected to the Phi Beta Kappa (q.v.), a famous college fraternity. He graduated in law from Columbia Univ., but did not practise, entering upon a stage career. He appeared in America in *Emperor Jones* and sev. other plays by Eugene O'Neill (q.v.), and then embarked upon a successful career as a concert singer, specialising in Negro spirituals. He came to London in 1928, appearing in the title roles of *Emperor Jones* and *Othello*, and gave a superb performance in the musical play, *Shubert*. He played sev. of his most successful roles in the screen productions. In 1942-45 R. appeared in a new production of *Othello* in the U.S.A., which was considered by many to be the finest performance of his career. He devoted himself increasingly to politics, and in the presidential election of 1949 supported Henry Wallace. *See* life by Mrs. Robeson, 1930.

Robespierre, Maximilien Marie Isidore (1758-94), Fr. revolutionary leader, b. at Arras. His father d. when he was young, and he owed his education to the bishop of Arras. Tradition says that R. learned the doctrines of republicanism from one of his tutors. He followed the family profession of advocate. In 1789 he was one of the deputies of the Third Estate at the States-General. His fanaticism, self-confidence, and oratorical skill soon made him well known, and, vigorously defending the liberty of the press, he attached himself to Mirabeau in the early days of the revolution. Soon he estab. a secure position among the Jacobins (q.v.), the extremist group. R. made the proposal that members of the Constituent Assembly should be barred from its successor, the Legislative Assembly. Therefore it was as a Jacobin club member, and not as a deputy, that he continued to exert his influence on the revolution. Calculating and callous, R. connected himself with the Marat-Danton group, using them as means to gain an undisputed ascendancy, and then bringing about their destruction. Yet his actions seem to have been dictated not from motives of personal ambition (his extraordinary disinterest in personal gain earned him Carlyle's title of 'the sea-green incorruptible'), but because of his conviction that only through him could the revolutionary ideals in which he believed so passionately be fully realised. This egotism grew with each new victory, so that, in R.'s last days, it amounted to some state of mental unbalance.

In Sept. 1792 he was elected to the National Convention, the organ which proclaimed the Fr. republic. He had

already helped to create the Revolutionary Tribunal. After the execution of Louis XVI., and the downfall of the Girondists, R. became a member of the newly formed Committee of Public Safety, the body which was the real ruler of France and in which he was supreme. He was largely responsible for the 'Reign of Terror' which destroyed his former friends, Danton (q.v.) and Desmoulins (q.v.). His power was now unchallenged, but his tyranny soon caused a plot for his destruction. At this point his character appeared to disintegrate, and his confidence wavered. He secluded himself from the meeting of the Convention on July 27, 1794, at which he was openly accused of despotism, and when, too late, he tried to obtain a hearing, his power had gone, and a decree of arrest was sent out against him. He



ROBESPIERRE

fled, but was captured and guillotined on July 28. His death marked the beginning of the reaction against the revolution which he had characterised in its most extreme form. *See also* under FRANCE, History. *See* lives by H. Belloc, 1901; A. Mathiez, 1921; G. J. Renier, 1936; and R. Korngold, 1937. *See also* T. Carlyle, *The French Revolution*, 1837, and E. Hamel, *L'Histoire de Robespierre après des papiers de famille, des sources originales, et des documents entières inédits*, 1865-78.

Robin, see ROBIN REDBREAST.

Robin Goodfellow, see PUCK.

Robin Hood, Eng. legendary hero, regarded as the leader of a band of outlaws who lived in Sherwood Forest. With his companions, pre-eminent among whom were Little John, so called from his huge stature, Friar Tuck, a jovial, pleasure-loving priest, and Maid Marian, his wife. R. H. lived a life of careless freedom and good-natured philanthropy, robbing the rich to give to the poor, and oppressing no righteous man. The oldest mention of R. H. at present known is in *Piers the Plowman* (1377); he was very popular in the fifteenth century and onwards, and

was mentioned at greater or less length by Shakespeare, Ben Jonson, Fuller, etc. Sov. theories have been put forward to explain the legend. It is at least probable that there is some historical basis for them, although he is regarded by some as simply the personification of the wind god, or a forest elf. Many of the customs and practices associated with his name were certainly added at a later date. See the collection of ballads in the fifth vol. of F. J. Child's *English and Scotch Popular Ballads*, 1888; also J. Hunter, *The Great Hero of Ancient Minstrelsy of England: Robin Hood*, 1852; Carola Oman, *Robin Hood*, 1937; and J. H. Gable, *Bibliography of Robin Hood*, 1939. See ROBERT'S MEN.

Robin Hood's Bay, seaside resort on an inlet in the E. coast of Yorkshire (N. Riding), England, 5 m. S.E. of Whitby, situated on lofty cliffs. The old vil. is one of the most picturesque in England. Pop. of par. (Fylfludale) 1300.

Robinia, genus of leguminous plants, grows wild only in N. America. It contains half a dozen species, all of which are large trees. *R. pseudacacia*, the bastard or false acacia, or locust-tree, is cultivated in Britain.

Robin Redbreast (*Erithacus rubecula*), commonest of the Brit warblers (Sylviidae) and the friendliest and most cherished Brit. bird. It has long been protected from human cruelty and destructiveness by an extraordinary amount of superstition and legend. Its protection is thoroughly deserved, for, while it is quite harmless to garden and farm crops, it destroys an enormous number of insects and other animal pests. Its sweetly modulated song is continued through the greater part of the year, and is especially noticeable in winter. Male and female differ very slightly in plumage, but the latter is rather less brightly coloured. The young birds are yellowish olive-brown on the upper part, and dull reddish-brown on the chin, throat, and breast. Two or three nests are made during the year, often in erratic and even ridiculous positions. In the U.S.A. a migratory thrush is called the robin. See D. Lack, *The Life of the Robin*, 1943.

Robins, Benjamin (1707-51). Eng. mathematician and engineer, b. at Bath. He studied engineering, and commenced experiments in gunnery, the results of which were pub. in his *New Principles of Gunnery* (1742). He made observations and experiments on the force of gunpowder, flight of rockets, etc., and invented the ballistic pendulum.

Robinson, Edwin Arlington (1869-1935), Amer. poet, b. at Head Tide, Maine. He attended Harvard Univ., but did not graduate, and afterwards he moved to New York and engaged in various occupations, among them a clerkship in the U.S. Customs House. He soon became known as a poet, some calling him a New England Browning. Keeping to the old regular forms of verse, he nevertheless showed his modernity by his frequent plunges into the subconscious, and was a leading 'psychological' poet. He sev. times received the Pulitzer prize for the

best poetry of the year. His best books include *The Children of the Night* (1897); *Captain Craig* (1902); and *The Man against the Sky* (1916). See lives by L. Lippincott, 1937; E. Kaplan, 1940; and E. Neff, 1949.

Robinson, Earné Stuart Lennox (b. 1886), Irish dramatist, b. at Douglas, Cork, and educated at Bandon Grammar School. From 1910 to 1914 and 1919 to 1923 he was manager of the Abbey Theatre, Dublin, of which he became a director in 1923. His best-known plays are *The Whiteheaded Boy* (1916) and *The Lost Leader* (1918), produced in London 1921 and 1920 respectively, also in the U.S.A. He also wrote sev. short stories and a novel. In 1946 he ed. the letters of Lady May Gregory. He pub. his reminiscences, *Curtain Up*, in 1942.

Robinson, Frederick John, see RIRON, EARL OF.

Robinson, Henry Crabb (1775-1867), Eng. journalist and diarist, b. at Bury St. Edmunds, Suffolk, and educated privately. He travelled abroad between 1800 and 1805, and two years later became *The Times* correspondent at Altona, and in 1808 represented the same paper in the Peninsula. He was called to the Bar in 1813, and joined the Norfolk circuit, of which he later became leader. He was a well-known figure in the literary society of the day, and knew Goethe and Schiller. He was a famous conversationalist. His *Diaries and Journals* were ed. by Thomas Sadler, and pub. in 1869. See Edith J. Morley (ed.), *The Correspondence of H. C. Robinson with the Wordsworth Circle, 1808-1886, 1927*, and *On Books and their Writers, 1937*; also lives by L. I. Vincent, 1913; Edith J. Morley, 1935; and J. M. Baker, 1937.

Robinson, Sir Hercules George Robert, first Baron Rosmead (1824-97), Brit. colonial administrator. He entered the army in 1844, but retired two years later, and served in Irish Gov. depts. until 1854, when he held various colonial appointments. He became governor of Cape Colony and high commissioner of S. Africa from 1880 to 1889. In that year he retired, being two years later created baronet. However, he returned to S. Africa in 1895, and within a few months of his arrival the Jameson Raid occurred, of which he had had no previous information. On his return to England in the following year he was raised to the peerage. He was an able colonial governor and an excellent administrator.

Robinson, William Heath (1872-1944), Eng. artist, b. at Islington. He studied at the R.A. schools. He illustrated Hans Andersen's *Fairy Tales*, *Arabian Nights*, Poe's *Tales of Mystery and Imagination*, *Don Quixote*, and *Rabelais*. His best-known work, however, was his humorous drawings for periodicals, his speciality being grotesque and laborious mechanisms involving the most complicated operation, in order to achieve the simplest possible purposes. See life by L. Day, 1947.

Robot, term derived from the Czech *robota*, meaning 'work,' and which has now

passed into current usage in Eng. since 1923, the year when Karel Čapek's play *R.U.R. (Rossum's Universal Robots)* was trans. into Eng. by Paul Selver. The play portrayed a society dependent on the work of mechanical men, and the term R. is now applied to all mechanisms which engineering science has devised to do the work ordinarily done by man. R. mechanisms have been used to steer ships without human aid (1927), to operate telephone transmitters (1927), and to pilot an aeroplane (1931). See also *AUTOMATON*; *REMOTE CONTROL*.

Rob Roy, *alias Robert MacGregor* (1671-1734), Highland freebooter, *b.* at Glen Gyle, Perthshire, by Loch Katrine. He derived his prin. income from cattle-lifting, exacting money (known as black-mall) for affording protection against thieves. He espoused the Jacobite cause in 1691, and in consequence of this and his plundering raids the penal laws were renewed against his clan in 1693. In 1712 he was accused of fraudulent bankruptcy, and in 1715 followed in the wake of the rebel army at Sheriffmuir and stood watching for the booty. He surrendered to the duke of Atholl in 1717, but soon escaped, probably through the protection of the duke of Argyll, to be again captured and imprisoned. He was, however, pardoned in 1727, and lived the rest of his life as a peaceful subject. He was buried beside his kindred at Balquhiddler churchyard, by the shores of Loch Voil. See the introduction and notes to Scott's *Rob Roy*, and lives by K. Macleay (now ed.), 1881, and A. H. Miller, 1883; also A. A. MacGregor, *Wild Drumalbyn*, 1927, and *Somewhere in Scotland*, 1948.

Robsaart, Amy, see *LICKSTER, ROBERT DUDLEY, EARL OF*.

Robson, Flora (b. 1902), Brit. actress, *b.* at S. Shields. She studied at the Royal Academy of Dramatic Art and made her first professional stage appearance in 1921. In 1933 she joined the Old Vic Company. She estab. a reputation as a fine Shakespearian actress and also gave outstanding performances in Tchekov's plays. She has appeared in a number of films, including *Fire over England* (1937); *Cæsar and Cleopatra* (1946); and *Black Narcissus* (1947).

Robson Peak, mt. in the Canadian Rockies, on the border between Brit. Columbia and Alberta. Height 12,975 ft.

Roe, or **Rukh**, fabulous bird, often identified with the Arabian *anā* and the Persian *simurgh*. It was supposed to be of enormous size and capable of performing wonderful feats of strength, *e.g.* carrying off elephants to feed its young. The legend of the R. is contained in *The Arabian Nights*.

Rosa, Cape, most westerly point of the Iberian Peninsula, 20 m. N.W. of Lisbon.

Rocamadour, vil. in the dept. of Lot, France, a famous place of pilgrimage. Its fifteenth-century church of Notre Dame contains a famous wooden figure of the Madonna. Pop. 1000.

Rocambol, or *Allium Scordoprasum*, species of Liliaceæ.

Roccella, see *ARCHIL*.

Rooh, St., see *ROQUE, St.*

Rooha, tn. of Uruguay, S. America, cap. of the dept. of Rooha, 105 m. N.N.E. of Montevideo. It was founded in 1793. The dept. has an area of 4280 sq. m. and a pop. of 82,800. Stock-raising is carried on and lead, iron, and copper are mined.

Rochdale, co. and municipal bor. of Lancashire, England, on the Roch, 11 m. from Manchester and 200 m. from London. It lies on the E. rim of the Lancashire industrial area, with the moors and hills of the Pennines rising to the E. and W. The setting of the tn. centre is impressive. Notable buildings are the Gothic tn. hall, built 1866-71, containing some striking examples of modern stained glass, the art gallery, the museum, library, infirmary, and sev. modern churches of all denominations. On the hill behind the tn. hall is the par. church of St. Chad, the fabric dating back to the fourteenth century. There are technical schools and high schools, five large parks, and about 144 ac. of recreation grounds and playing fields. Industries include cotton spinning and weaving, dyeing, finishing and bleaching, textile engineering, rubber and cable making, felt-mongering, leather manufl., and paper and paper-tube making. There are important cattle markets, and the corporation controls the large covered market hall. The Byron family became owners of the manor of R. in 1462, and retained it, except for a short period during the Commonwealth, until 1823. In the sixteenth century R. was famous for its hats and cutlery, but it did not become a bor. until 1856. R. is known as the bp. of the Co-operative movement in its modern form (see under *CO-OPERATION*). It was also the home of John Bright, who is buried here, and whose statue stands on the park slopes, and the bp. of Grade Fields. An old R. custom is the gathering of rushes in Aug. with which to cover the cold stone floors during the winter, and this ceremony of carrying the rushes to the church is still commemorated in 'Rushbearing Week,' the parallel of 'Wakes Week' of other tns. Pop. 87,000.

Rochdale Canal, in Lancashire and Yorkshire, England, extends from the Bridgewater Canal at Manchester to the Calder and Hebble Navigation at Sowerby Bridge, near Halifax. It has 78 locks and is 31 m. long.

Roche Abbey, ruined Cistercian abbey in Yorkshire, England, 2 m. S. of Malby. R. A. was founded from Fountains Abbey (q.v.) in 1147. Parts of the chancel, gateway, and transepts remain.

Roche, Alexander Ignatius (1861-1921), Scottish painter, *b.* at Glasgow. He studied art in Glasgow and Paris. He specialised in landscape painting in which some figure drawing was incorporated. In 1896 he moved from Glasgow to Edinburgh and developed portrait painting. He became an R.S.A. in 1900. R. is remembered for his frescoes in the banqueting hall of Glasgow municipal buildings, executed in 1900.

Roche Alum, see *ROCK ALUM*.

Roche, Sir Boyle (1743-1807), Irish

politician and soldier. In 1777 he was elected a member of the Irish House of Commons. A man of rare wit and humour which included some of the most famous 'bulls' on record, he won a great reputation. Made a baronet in 1782.

Roches, Mazo de la see **DE LA ROCHE**
Rocheschouart, Françoise Athenais de, see **MONFISIAN, MARQUISE DE**

Rochefort, in the prov. of Namur, Belgium, 20 m S.E. of Dinant. It is noted for its quarries of red marble and lead mines and also for the remarkable caverns and grottoes existing in the neighbourhood. Pop. 3500.

Rochefort-Lucay, Victor Henri, Marquis de (1830-1913) known as **Henri Rochefort**, Fr. journalist and publisher in

of France on the Atlantic coast cap of the dept. of Charente Inférieure. Its industries include shipbuilding, saw-milling, and the manu. of briquettes and chemicals as well as sardine and tunny preserving and petroleum refining. The rearing of oysters and mussels and the exploitation of salt marshes are also carried on. Trade is mainly conducted by means of the port **La Pallice** which was inaugurated in 1891 to enable the largest vessels to approach **La R.** and large quantities of wine, brandy, fancy goods, skins, coal, and briquettes and furniture are exported annually. The chief buildings are the cathedral in massive Gothic style with a dome, the *hôtel de ville* resembling a fortress, the episcopal palace



RICHIEUX AT THE WHARF OF LA ROCHELLE

A painting by Henri Motte

Paris and educated at the College of St. Louis. His first attempt at play writing in 1846 was a vaudeville (*Un Monsieur bien mis*). He followed up this success by writing a number of farces and vaudevilles. He gradually abandoned play writing for journalism and was attached to the staff of several prominent Parisian papers including the *Figaro*, the *Scieil* and *L'Événement*. The vigour and irony of his criticisms brought R into conflict with several celebrities of the time and he fought a number of duels. Eventually he edited his own paper *L'Intransigent*.

Rochefort-sur-Mer, seaport of France in the dept. of Charente Inférieure near the mouth of the Charente, 127 m S.W. of Paris. Iron and copper founding and shipbuilding are carried on. There is trade in brandy, dairy products, wines, cattle, grain, and salt. **Pierre Loti** (*q.v.*) was b. in R. sur M. Pop. 29,500.

Rochefoucauld, see **LA ROCHEFOUCAULD**, **FRANÇOIS, DUC DE**

Rochelle, La, fortified city and seaport

with a library of 25,000 vols. and a museum and the arsenal. **La R.** is surrounded by ancient fortifications; there are three towers facing the sea, two of them dating from the fourteenth century. It was a Huguenot centre in the fifteenth and sixteenth centuries. **La R.** stood the siege of the duke of Anjou in 1573. **Richelieu** besieged it in 1627. It suffered after great suffering in Oct. 1793. In the sixteenth and seventeenth centuries it was the centre of trade with Canada. During the Second World War **La R.** was used as a U-boat base by the Germans and is such was frequently bombed by the Allies. Pop. 48,900. See *Le Vaux de Poitiers*, *La Rochelle autrefois et d'aujourd'hui*.

Rochelle Salt, or **Seignette's Salt**, tartrate of sodium and potassium ($\text{KNaC}_4\text{H}_4\text{O}_6 \cdot 4\text{H}_2\text{O}$) discovered by **Seignette** of Rochelle. It is a colourless solid forming rhombic prisms; is soluble in water and possesses a saline taste. It is prepared by neutralising acid potassium tartrate with

sodium carbonate, and concentrating the solution until solidification is imminent, when it is allowed to crystallise. It is used in medicine as a laxative by itself, and also as an ingredient of the 'blue' powder in a Seidlitz combination. It is also a constituent of Fehling's solution, which is used in the estimation of sugars.

Rochers de Naye, one of the chief peaks of the Bernese Oberland Mts., Switzerland, with an altitude of 6710 ft.

Roches Moutonnées, bare, smooth, rounded rocks, so called from their supposed resemblance to sheep, which are the result of glacial action in former ages.

Rochester, John Wilmot, second Earl of (1647-80), Eng. courtier, *b.* at Ditchley, Oxfordshire, and educated at Wadham College, Oxford. After travelling abroad and serving in the navy against the Dutch, he became one of the profligate set at the court of Charles II. that included Buckingham, Sir Charles Sedley, and Henry Saville. R. was interested in literature, and was a patron of Dryden. He himself wrote numerous verses, in which he showed himself possessed of an agreeable power of lyrical and satirical composition, though many of his pieces are marred by their licentiousness. A fairly full ed. of his poems was pub. by J. Tonson in 1741; in 1926 they were ed. by J. Hayward. The fullest ed. of his poems is that of 1731-32. See lives by V. de Sola Pinto, 1935, and C. Williams, 1935.

Rochester, Viscount, see SOMERSET, EARL OF.

Rochester, city and port of Kent, England, on the Medway, 30 m. E.S.E. of London, of great historical interest. It began as a small and prosperous tn. in the Rom. occupation, and as it stands where the Dover Road (Walling Street) crosses the tidal Medway, it has played an important part in national as well as Kentish hist. Its importance dates from A.D. 604, when Augustine founded a bishopric (the third in the kingdom), and a church was endowed by King Ethelbert. A Norman cathedral and Benedictine priory replaced the Saxon church, and about the middle of the Norman period a strongly defended castle was built. The earliest charter is of 1165. There are important remains of the cathedral, priory, and castle. The W. doorway of the cathedral with its highly decorative carving is unique in England. Extension to the fabric was made possible by rich offerings to the shrine of William of Perth, a pious baker who was murdered close to Rochester in 1201 during the course of a pilgrimage. He was buried in the cathedral; miracles took place at his tomb, and he was canonized in 1256. Charles Dickens spent some of his childhood at Chatham (adjoining R.), and the last years of his life at Gadshill Place on the R.-Gravesend road. His writings incorporate a great fund of local associations, and the city is often regarded as the centre of 'Dickens Land.' There are notable churches, public buildings, and old houses. There are manufs. of agric. and other light machinery, and of gypsum

and cement products. Pop. 41,700. See R. F. Jessup, *Travel Association Information Sheet No. 40*, 1946.

Rochester: 1. City of New York, U.S.A., co. seat of Monroe co., on the Genesee 67 m. E.N.E. of Buffalo. The city is well laid out, with boulevards, parks, and other open spaces, and possesses a univ. Manufs. comprise clothing, boots and shoes, furniture, cigars, carriages, machine-shop products, photographic apparatus, and optical appliances. Pop. 325,000. 2. City of Stratford co., New Hampshire, U.S.A., on the Corbisco R.; has various manufs. Pop. 12,000. 3. City and co. seat of Olmsted co., Minnesota, U.S.A.; has grain elevators and stock-yards, as well as foundries, machine shops, and flour and grist mills. Pop. 26,300. 4. Ror. in Beaver co., Pennsylvania, U.S.A., about 25 m. N.W. of Pittsburgh. It is in the coal and oil region. Pop. 7400.

Roche-sur-Yon, La, formerly *Napoléon Vendée*, tn. of France, cap. of the dept. of Vendée, on the Yon, 45 m. from Nantes. The castle of La Roche was the scene of many battles in the Hundred Years war and in the wars of religion, and the stones from its ruins were used by Napoleon in 1801 (when he made La Roche the cap. of the dept.) for the erection of the gov. buildings. The tn. is a market for farm produce, and has flour-mills. Pop. 18,100.

Rochet, narrow-sleeved linen garment, the lower part being of lace, worn under the *mozetta* as part of the choir dress by prelates who are not members of religious orders. To wear it not covered by the *manteletta* is a sign of jurisdiction.

Rochford, tn. of Essex, England, 3½ m. N. of Southend; it was the bp. of Anne Boleyn. Pop. 18,800.

Rochlitz, tn. of Saxony, Germany, 16 m. N.W. of Chemnitz. It has textile and other manufs., and porphyry is quarried. Pop. 6300.

Rock (O.F. *roke*, probably of Celtic origin), in common speech, large mass of hard earth-forming material; in geology all masses forming part of the earth's crust, whether they be hard or soft. Rs. are primarily classified according to their origin as sedimentary, igneous, or metamorphic. *Sedimentary* Rs. are those which have been deposited in layers by the action of water; *igneous* Rs. are those which have solidified from the molten state; if ejected at the surface of the earth they are known as volcanic Rs., and if occurring deep down below the surface they are termed plutonic Rs.; *metamorphic* Rs. are those which were originally sedimentary or igneous, but have undergone alteration of form through heat, pressure, etc. The study of the arrangement and composition of Rs. is part of the science of geology. Sedimentary Rs. often contain fossilised remains of animals and plants; these phenomena are classified and studied under the name of *paleontology*. The description of R. material itself comes under petrology. Many Rs. are composed of varying proportions of a number of simpler substances known as minerals and studied under the head of mineralogy. If of crystalline form, these minerals are

further studied in the science of crystallography.

Rockall, or **Rokol**, uninhabited rocky is., part of a reef in the Atlantic, 289 m. W. of Ardnamurchan Point in Scotland, and 268 m. from Bloody Foreland, Ireland. It is 250 ft. in circumference, and appears to be the highest peak of a submerged mt. range, possibly part of a drowned land mass. The is. supports a famous colony of guillemots. It lies in an area extremely dangerous to shipping, and is otherwise well known as giving its name to a weather forecast (*q.v.*) area of the Air Ministry meteorological service.

Rock Alum, or **Roches Alum**, alum of good quality, said to have been first prepared at Roccha or Roha (Edessa).

Rock Asphalt, see **ROADS, Construction**.

Rockaway Beach, summer resort of New York, U.S.A., with a long beach, on the S. coast of Long Is., 17 m. S.E. of Brooklyn.

Rock-basins, concave depressions in rock, sometimes of great extent, and often filled with water. Many lakes in the highlands of Scotland and other mountainous regions fill R. The most generally accepted theory as to their origin is that they were formed by the action of ice during the glacial period. The effect of a glacier flowing down a valley would be to erode the rocks over which it flowed, shearing masses from the tops of the hills and causing the striated effect generally associated with ice action. It is also suggested that where the configuration of the valley caused the massing of the ice in a narrower and deeper layer, the rock would be scooped out in a concavity whose general features would be that of a rock-basin. It is only fair to add that many prominent geologists do not approve of the glacial theory, and do not regard the formations known as R. as a general type with a common characteristic.

Rock Channel, S. fairway into the mouth of the Mersey, along the N.W. coast of Wirral Peninsula, Cheshire. It is 5 m. long and about $\frac{1}{2}$ m. wide.

Rock-climbing is really part of mountaineering (*q.v.*), but is practised independently in the Brit. Isles, where climbing on snow and ice are rarely available, except in Scotland in winter. R.-C. in the Brit. Isles is more artificial than mountaineering proper, as it usually involves the choice of a way up the 'difficult' side of a mt., instead of the line of least resistance to the summit (the summit being the goal in both cases). The good rock-courses, however, have the merit that once embarked on they must be followed, no alternative easy way being available. The chief centres for the sport are the Eng. Lake Dist. (notably Scafell, Great Gable, Pillar, Langdale Pikes), N. Wales (notably Lliwedd and Clogwyn du'r Arddu on Snowdon, the Glyders and Tryfan), and Scotland (notably Glencoe, Ben Nevis, the Cairngorms, the Torridons, and Skye). Historically R.-C. began during the last century with 'gully' climbs, where gymnastic strength rather than delicate balance is required; later rock-climbers came to consider *arêtes* rather than the often wet and dirty gullies

as the most favourable route for attack. In the last few years the adoption of 'rubbers' in dry weather instead of nailed boots has raised the standard of what is possible, and climbers have worked out many exposed routes on the actual rock faces. The rope is used chiefly to make possible for the rest of the party anything that the leader can climb, the principle being to divide the rock-climb into pitches; at the top of each pitch the leader must be securely placed himself, and able to belay the rope round a firm piece of rock while he brings the second up; when the second is secure the leader climbs the next pitch, the second brings up the third, and so on; occasionally the rope can be used, too, to safeguard the leader, e.g. on an exposed traverse, or for a difficult step when the second is near him. The various available courses have been classified in great detail. R.-C. has gained enormously in popularity in recent years, and was used in the Second World War as part of the training of col.andos and other special troops. A vogue for R.-C. has also sprung up on the Continent, accompanied by widespread use of pitons, slings, snaplinks, and other devices, which have made it possible to climb overhangs and holdless vertical walls and faces. Opinions differ as to whether such methods are compatible with R.-C. as a sport.

R.-C. in the Brit. Isles, owing to weather conditions and shortness of expeditions, is much less dangerous than mountaineering; but accidents are frequent, and any would-be climber must serve an apprenticeship with a leader of experience. Proficiency in R.-C. is of the utmost value to the mountaineer, and may be a great safeguard to the whole party on any expedition; it is indispensable in many of the major climbs in the Alps, Rockies, and Himalayas. See the guides, pub. by and the journals and bulletins of the Climbers' Club, Fell and Rock Club, and the Scottish Mountaineering Club; also J. E. Q. Barford, *Climbing in Britain*, 1916; G. W. Young, *Mountain Craft* (5th ed.), 1946; W. H. Murray, *Mountaineering in Scotland*, 1947; and G. D. Abraham, *British Mountain Climbs*, 1943.

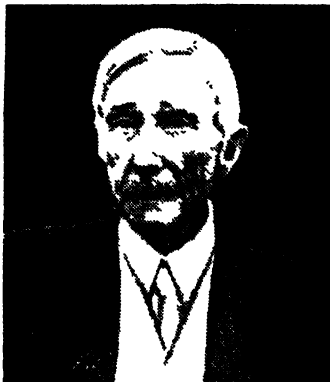
Rock Cross, see **ARABIS**.

Rock Crystal, see **QUARTZ**.

Rock Drills, see under **PISTOL MACHINERY**.

Rockefeller, **John Davison** (1839-1937), Amer. capitalist, b. at Richford, New York, and educated at schools in Cleveland, Ohio. Later he secured a job as an assistant book-keeper in a commission house. Although his salary was small he managed to save enough by 1868 to buy a share in a produce firm. The production of petroleum had become a big industry in the U.S.A., and Samuel Andrews invented a process for cleaning the crude oil, or 'oil refining.' R. and his partner backed Andrews, and in 1867 the firm became Rockefeller, Andrews & Flagler. By 1870 they had become the leading oil firm in Cleveland, the capital of the firm now organised as the Standard Oil Company (*q.v.*) being \$1,000,000, R. holding nearly three-fourths of the shares.

This new corporation began rapidly buying up and consolidating smaller concerns. By 1880 it had control of about 90 per cent of the Amer. oil refineries. The



J. D. ROCKEFELLER, SENIOR

Standard Oil Company became known as a ruthless competitor. In 1882 R. founded the first of those gigantic combinations which have since become known as 'Trusts.' The trustified companies were able to cut overhead costs and maintain a certain level of prices. The Standard Oil Trust was capitalised at \$100,000,000. Various decisions against it were pronounced by state courts, but were overruled. Finally, in 1911, the U.S. Supreme Court ordered the dissolution of the trust on the ground that it was a combination in restraint of trade under the Sherman Anti-Trust Law. Meanwhile R had become the world's richest man. He not only had a vast fortune out of oil, but owned big ore-fields in Minnesota, extensive coal-fields in Colorado, and also held large shares of stock in the railways and big blocks of bank stock. He retired from the presidency of the Standard Oil Company of New Jersey in 1911, turning over all his business affairs to his son, John D., junior.

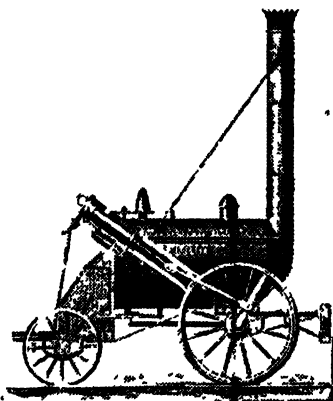
The suits against all companies and the exposure of some of the business methods employed inflamed public anger and R. for some time was probably one of the most hated men in the country. But his huge gifts to science, education, and public health and favourable press reports gained him popularity in his later years. He became indeed a classic Amer. 'character,' personifying the successful business magnate. To charities and educational institutions he gave in his lifetime over \$500,000,000. See also under STANDARD OIL COMPANY. See lives by J. T. Flynn, 1933, and A. Nevins, 1941.

Rockefeller, John Davison, junior (b. 1874), Amer. industrialist and philanthropist, only son of J. D. R., b. in Cleveland, Ohio, U.S.A., and educated at Brown Univ. He entered his father's business, and soon became his leading assistant in

the oil and coal enterprises. When his father retired all his affairs were put into the hands of his son, who devoted much time to superintending the gifts made by the various R. foundations. Among his lavish gifts was a large sum towards the restoration of Rheims cathedral. In 1946 he gave the United Nations land, worth about £2,000,000, as a site for its buildings in New York.

Rockefeller Foundation, with kindred organisations endowed by John D. Rockefeller (q.v.), the oil millionaire, wealthiest public trust in the U.S.A. The R. F. proper was chartered in 1913 for the stated purpose of benefiting all mankind. It has not only devoted its beneficences to America, but to countries all over the world, aiding them to fight plagues like yellow fever, malaria, hook worm disease, and endowing medical colleges and nursing institutions. In 1949 assets of the R. F. proper amounted to \$125,767,836. \$383,234,492 having been expended since the foundation was instituted. The original endowment was \$182,314,480. The General Education Board, also endowed by Rockefeller, has given over \$282,466,599 to schools and colleges. The Rockefeller Institute for Medical Research, also heavily endowed, has conducted extensive investigations in medicine and surgery. Its laboratories are among the finest in the world and, with its rich resources, it is enabled to give to researchers extensive facilities.

Rocket, term applied to sev. plants of different genera all belonging to the family Cruciferae. *Cakile maritima*, the sea-rocket, grows on the coasts of Britain; it has a long tap-root and fleshy leaves. The two Brit. species of *Barbarea* are known as yellow-rocket or winter-cress, and the one Brit. species of *Hesperis* is also a R.



THE 'ROCKET'

Rocket Engines, see under AERO-ENGINES.

'Rocket,' The steam locomotive built by George Stephenson (q.v.) which in Oct.

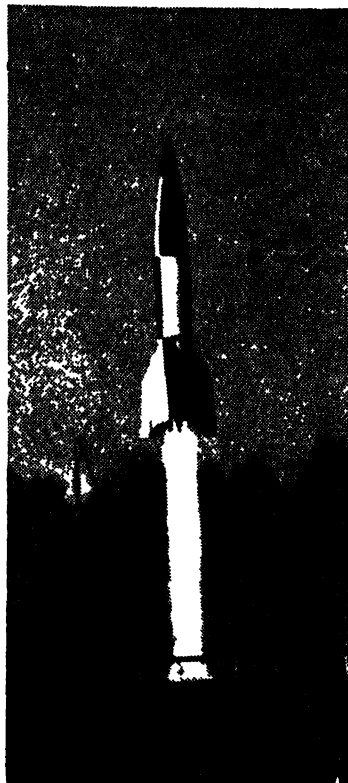
1829 won the famous Rainhill competition, and so decided the use of locomotives on the Liverpool and Manchester Railway. The design of locomotives changed little from that of the 'R.' until the 1870s.

Rockets. Invented by the Chinese about A.D. 1200, the rocket became well known in Europe soon afterwards, both as a firework and as a spectacular but erratic weapon of war. Its serious military development was begun in 1801 by Sir Wm. Congreve, stimulated by reports of its effective use against the Brit. by Hyder Ali in Mysore, India. As a result of Congreve's experiments war R. with ranges up to 3000 yds. and weights of up to 42 lb. became extensively employed in many countries, and for a while challenged the crude guns of the period: but improvements in artillery rendered them obsolete by 1850. For the next seventy years the main use of the rocket was in pyrotechnics (*q.v.* and see below) and life-saving apparatus.

In the twentieth century interest in the rocket was revived when it was realised by Zolkovsky, Goddard, Oberth, and others (see *Space Travel* below) that rocket propulsion was effective in a vacuum and that enormous improvements in performance would be possible if the old gunpowder type propellants were replaced by liquid fuels. The development of the liquid-propellant rocket was commenced in the U.S.A. around 1920 by R. H. Goddard and in Germany from 1927 onwards by the Verein für Raumschiffahrt ('Society for Space Travel'). The first actual flight of a liquid-propelled rocket was made by Goddard at Auburn, Massachusetts, in March 1926. Progress was slow owing to lack of support and general scepticism, except in Germany, where after 1933 the work of the Verein für Raumschiffahrt was continued by the army at the great research station at Peenemünde, on the Baltic, and elsewhere. This resulted in the long-range projectile V.2 (V.4) and many other guided missiles and rocket devices. Considerable work, though on a much smaller scale, was conducted by the Allies during the Second World War in the field of solid-propellant R. for short-range bombardment, A.A. defence, etc. At the close of the war a wide variety of rocket weapons existed, many of a revolutionary nature. Extensive research, particularly into the problem of the long-range guided rocket, is now being carried out in many countries. The centre for Brit. Commonwealth research will eventually be the Anglo-Australian range near Adelaide. It extends across the desert and on to the Indian Ocean, so that projectiles with ranges up to 3000 m. may ultimately be tested. It is still convenient to divide R. into the two classes of solid- and liquid-propelled, and the uses of the various types are listed below.

Solid Propellant.—Although solid-propellant R. have been made with weights of well over 1 ton, and ranges of 120 m., most R. in this category are relatively small and of short range. They include the familiar pyrotechnic and life-saving devices, and their most important military

application has been as recoilless projectiles. Since the rocket provides its own propulsion, it needs only the lightest of launching gear, and is therefore at an enormous advantage over conventional artillery. It has thus become possible for aircraft to carry the equivalent of 6-in. guns, or for one man to handle and fire a weapon (*e.g.* the anti-tank Bazooka) as



Imperial War Museum. Crown copyright

V.2

A rocket leaving the firing table during experiments conducted by the British Army Special Projectiles Operations Group, Cuxhaven, Oct. 10, 1945

powerful as a small field-piece. Although such R. have a relatively poor accuracy, this is not always a disadvantage and massed rocket-projectors are a very efficient means of laying down barrages for assault purposes.

Rocket torpedoes and rocket-accelerated bombs have also been developed, the latter to give increased penetration. Solid-propellant units have been widely

employed for the assisted take-off of aircraft (see below).

Liquid Propellant.—The modern liquid-propellant rocket employs two fuels stored in separate tanks, and forced into the motor by pumps or gas pressure. Its thrust, unlike that of the solid-propellant rocket, can thus be regulated or reduced to zero at any time. The powers developed are also very much greater (e.g. up to 600,000 h.p. in the case of V.2). Attempts have been made to develop R. using a single propellant, which would greatly simplify design, but only one 'monopropellant,' concentrated hydrogen peroxide, has been successfully used on any scale. The best-known fuel for bi-propellant R. is the mixture of alcohol and liquid oxygen used in the V.2, first fired at Peenemünde in July 1942, and used operationally against London, Belgium, and Holland from Sept. 1941 until the end of the war. About 2000 crossed the Eng. coast, and some 1230 fell in the London area. Its maximum speed was about 3600 m.p.h., and with 1 ton of explosive its range was over 200 m.; V.2s fired vertically have reached altitudes of 115 m. Of the rocket's total mass of 12½ tons, 8½ tons were propellant, which it consumed in about 1 min. It was steered in flight by small vanes in the exhaust jet, controlled by a mechanism which slowly turned the rocket from its initial vertical ascent to an angle of 45° with the horizontal, and cut off the power when the missile had attained the speed necessary to give it the required range. The large external fins served merely to keep the rocket (now travelling as a free projectile) on the correct course when it re-entered the dense lower atmosphere. The total duration of flight for the 200 m. was about 5 min. V.2 may be regarded as the prototype of the long-range rocket of greatly improved performance, which may eventually replace the heavy bomber. For many missions the rocket is more economical than the bomber, and it is practically immune from interception. At the close of the Second World War the Gers. were considering a transatlantic missile with a maximum speed of 8000 m.p.h. This would have been a two-stage rocket, the upper component being a winged V.2 which would be 'boosted' into space by a much larger rocket, jettisoned as soon as its fuel was exhausted. This principle of the 'step-rocket' will play an important part in future development, since by using a sufficient number of 'steps' any desired final speed can be attained.

Numerous smaller guided missiles were developed by the Gers. during the Second World War for various purposes, such as A.A. defence and attacks against shipping. These R. were winged and capable of speeds in the sonic region: when controlled by radio and fitted with proximity fuses they would have been deadly weapons against aircraft. They offer the only conceivable form of defence, and that a slim one, against the long-range rocket. Such missiles may also be expected in due course to replace the heavy guns on battle-

ships: as they could be launched from quite small vessels they might in fact render the large capital ship superfluous. Because of their short endurance R. have had only limited application for aircraft propulsion. One pure rocket fighter did, however, appear in the Second World War, the Ger. Me. 163, burning hydrogen peroxide and a mixture of hydrazine hydrate and methyl alcohol. The maximum speed was nearly 600 m.p.h., and though the powered endurance was only 12 min. this could be extended by gliding. Its enormous rate of climb (over 10,000 ft. a minute) made continuous patrols unnecessary, and it was planned to keep the aircraft on the ground until the enemy bombers were a few miles away, when it would climb almost vertically to intercept them. Such a machine may be regarded as a half-way step to the unmanned, radio-controlled guided missile.

The chief aeronautical use of R. has been for assisted take-off for heavily loaded aircraft. This technique is of considerable economic importance, since it would make higher payloads and ranges possible: it may become standard for the large jet aircraft of the future.

As the rocket provides the only means of leaving the earth's atmosphere, it is now extensively used for very high altitude research, and numerous missiles have been built to carry scientific instruments to altitudes of 200 m. or more. Some of these operate radio transmitters so that observations can be continuously recorded at ground stations, and techniques have now been evolved to return the instruments safely to earth. Much has already been learned about cosmic rays and extra-terrestrial radiations which are shielded by the atmosphere, and cannot be observed in any other way.

The very heavy fuel consumption when chemical propellants are employed makes it appear unlikely that R. will be used for long-range passenger transport, though if it proves possible to utilize atomic energy for rocket propulsion this objection may be overcome, and commercial speeds in the range 10,000–20,000 m.p.h. may ultimately be expected. The most significant future use of the rocket, however, may not lie among its 'terrestrial' applications, but its employment for the propulsion of interplanetary spaceships.

Space Travel.—Interplanetary flight has been the subject of literary speculation for centuries, but only in recent times has it become possible to indicate solutions of the many problems involved. Chief among these are the need for a form of propulsion which will operate in airless space, and a supply of energy sufficiently great to overcome the earth's gravitational attraction. The rocket whose efficiency in vacuum is considerably greater than in air, automatically fulfils the first requirement, and may in principle fulfil the second. Realisation of this fact (notably by Goddard in the U.S.A. and Oberth in Rumania) was directly responsible for the great interest in R. which began in the 1920s, and culminated in the

spectacular developments of the Second World War.

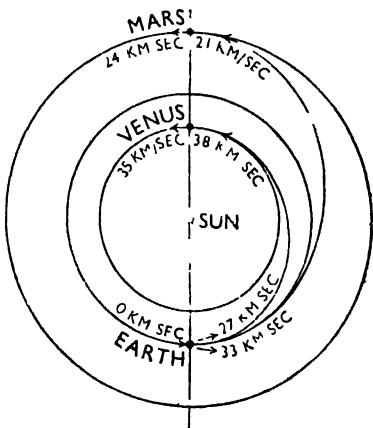
To escape from the earth a rocket must attain a speed of 11.2 km./sec. (25,000 m.p.h.), after which it would travel on into space with no further expenditure of power. Attainment of such speeds with chemical propellants demands a multi-stage or 'step' technique, in which a large rocket carries a smaller one as its payload, and is jettisoned when its fuel is exhausted. The small machine may carry yet a third stage, and with a sufficiently large number of steps any final speed may be reached at the cost of a large initial mass. Since Mars and Venus may be reached with velocities only about 3 km./sec. greater than that needed to escape from earth, such machines could have interplanetary ranges.

Two solutions have been proposed to overcome the difficulty of the enormous size of R. required to carry sufficient food, air, etc., to enable men to make such voyages. A rocket reaching a horizontal speed of 7.9 km./sec. (18,000 m.p.h.) just outside the atmosphere would continue to circle the earth indefinitely like a second moon, and if other R. were sent up into the same orbit they could be brought to rest, by steering jets, with respect to it, and so could transfer their surplus fuel (as in aircraft 'flight refuelling'). In this way the tanks of the first machine could be replenished, and as it would now need an additional speed of only 3.3 km./sec. to reach the 11.2 km./sec. 'escape velocity,' journeys to the moon and nearer planets would then become possible.

Such 'orbital' techniques may have other extremely important applications, and the construction of artificial satellites or 'space stations,' both for refuelling interplanetary vessels and for scientific research, has received much attention. They would be ideal meteorological and astronomical observatories, and appear to provide a complete solution to the otherwise intractable problem of world-wide radio and television coverage. Their military value is also obvious, and was studied by the Gers. before 1945, and, later, by the U.S. Gov. Even with these techniques, however, interplanetary journeys would still require enormous quantities of fuel, and the practical development of 'astronautics' awaits the harnessing of atomic energy. A few pounds of fissile material would, in theory, suffice to propel sev. hundred tons to any point in the solar system. Attempts will probably be made to produce nuclear reactors, operating at very high temps., which will accelerate jets of a light gas (e.g. hydrogen), and so provide a propulsive thrust. The other problems of space flight, though numerous, are of a subsidiary character, and many have already been solved in the development of high-altitude flying. Two possible hazards, meteors and cosmic rays, have been greatly exaggerated: statistical analysis has shown that the risk of meteor collisions is very small. A condition which may prove dangerous in space is that of 'weightlessness.' This would obtain

for the whole duration of any journey apart from the few minutes of take-off or landing, and *not* merely at the balance-point between opposing gravitational fields. However, if necessary an effect of apparent gravity could be produced by giving the ship a slow spin about its axis. Centrifugal force would then give an impression of normal weight.

Typical orbits for journeys to Mars and Venus are shown in the diagram. These are the paths requiring the least fuel expenditure, since they make the greatest use of the planets' existing orbital velocities. The duration of the journeys would be approximately: Earth to Venus, 146 days; Earth to Mars (mean distance),



THE ORBITS FOR JOURNEYS TO MARS AND VENUS

The most economical orbit ('cotangential ellipses') and the approximate speeds of the planets and of a spaceship at the beginning and end of its journey are shown. It will be seen that the 'transfer velocities' to change from one orbit to another are relatively small, i.e. 3 km. sec.

258 days. The more direct and much quicker paths would require enormously greater fuel expenditure. The exploration of the solar system, and the establishment of suitably heat- and air-conditioned bases on many of the planets, may well be by far the most important outcome of the harnessing of atomic energy. Its consequences in every field of life and thought will be matched, if at all, only by the revolution in human thought following the discovery of the world in Renaissance times. See also INTERPLANETARY SOCIETY BRITISH.

See W. Hohmann, *Die Erreichbarkeit der Himmelskörper*, 1921; H. Oberth, *Weg zur Raumschiffahrt*, 1929; R. Esnault-Pelterie, *L'Astronautique*, 1930; W. Loy, *Rockets and Space Travel*, 1944; R. H. Goddard, *Rockets*, 1916; G. P. Sutton, *Rocket Propulsion Elements*, 1949; A. C. Clarke, *Interplanetary Flight*,

1950; and the Jours. of the Amer. Rocket Society and the Brit. Interplanetary Society.

Rock-fish, see WRASSE.

Rockfoil, see SAXIFRAGE.

Rockford, city and co. seat of Winnebago co., Illinois, U.S.A., on the Rock R. It is one of the most important industrial cities of Illinois, and manufs. furniture, agric. implements, hosiery, and foundry and machine-shop products. Water power for industry is obtained from the Rock. Pop. 84,600.

Rockfowl, Guinea and Cameroon, see under PICATHARTES.

Rockhampton, tn. of Queensland, Australia, in Livingstone co., on Fitzroy R., 420 m. N.W. of Brisbane. Precious metals are mined and gems found. Meat preserving is a thriving industry. Pop. 36,000.

Rockingham, Charles Watson-Wentworth, second Marquess of (1730-82), Brit. statesman, educated at Westminster School and St. John's College, Cambridge. He was made earl of Malton in 1750 and in the same year succeeded to the marquise. He was a Whig, and held sev. minor offices from 1751 until 1762; but three years later became Prime Minister for a short time and repealed the Stamp Act. He led the opposition in the House of Lords until March 1782, when he again formed an administration. His zealousness led him into blunders, and he was an ineffectual leader. See memoir by Lord Albemarle, 1852.

Rocking Stones, large boulders or rocks, so resting on their bases that they move gently to and fro when agitated by the hand. There are sev. famous R. S. in Cornwall, in Wales, and in Ireland. The Logan rocking stone in Cornwall is one of the largest and best known in England. R. S. have been used for purposes of divination at various times. They are of interest to geologists as examples of differential weathering and denudation.

Rock Island, city and co. seat of Rock Is. co., Illinois, U.S.A., on the Mississippi. It has manufs. of lumber and agric. implements. On an is. in the riv. is a great arsenal and armoury. Pop. 38,000.

Rockland: 1. City of Maine, U.S.A., co. seat of Knox co., situated on Penobscot Bay, 88 m. E.N.E. of Portland. It has developed into a fashionable seaside resort. Shipbuilding and the manuf. of cotton and iron and steel products are the leading pursuits. Pop. 8900. 2. Township of Plymouth co., Massachusetts, U.S.A., 20 m. S.S.E. of Boston; manufs. boots and shoes, and tacks. Pop. 8100.

Rockland Lake, vil. of Rockland co., on the Hudson R., about 30 m. from New York. It is near Rockland Lake, a large sheet of fresh water from which 300,000 tons of ice are annually cut.

Rockling, term applied to small fishes of the genus *Onus* or *Motella* in the cod family Gadidae. Sev. species are found on Brit. coasts.

Rock Melon, see CANTALOUPE.

Rock Monday, see FLOUGH MONDAY.

Rock Oil, see PETROLEUM.

Rock Plants, those which thrive best

among stones or rocks in exposed places. Good drainage is essential, because many alpine, which make admirable R. P., while not injured by severe cold and strong sun, cannot withstand excessive moisture. A simple way of making a rock garden is to dig out soil to a depth of about 18 in., putting a layer of broken bricks for drainage. This should be filled in with a good light soil intermixed with sand and peat, and arrange rough pieces of rock or sandstone and there should be plenty of soil for the plants to root freely. Dwarf plants and other suitable species of saxifrage, sedum, candytuft, lithospermum, dianthus, primula, anemone, etc., should be chosen. See R. Farrer, *The English Rock Garden*, 1919; C. Elliott, *Rock Plants*, 1935; and G. A. R. Phillips, *The Rock Garden and Alpine Flowers*, 1947.

Rock Rabbit, see under HYRAX.

Rock River, riv. of the U.S.A., rising in Wisconsin and flowing into the Mississippi near Rock Is. It is 330 m. long.

Rock Rose (shrubs), see CISTUS.

Rock Salt, see SODIUM.

Rock Sculpture and Engraving. Its distribution ranges over many countries, and broadly speaking varies in date from the Upper Palaeolithic to the Bronze Age. The R. S. and E. of early man may represent a magic protection to his home; it is certainly linked in some cases with hunting economy and the influencing of food supplies; and again elsewhere there is the possibility that this decoration marks a folk-gathering place or even a cult-shrine or religious sanctuary. In the Sahara there are rock engravings which seem to date from the end of the Palaeolithic period down to the present day. In S. Africa the sacred animals of Egypt are represented together with those of Central Africa, and it is thought that the bushmen were still practising this form of art in the nineteenth century. The most famous sculptures and engravings are those in caves in various parts of S. France (see LASCAUX CAVES) and Spain; their distribution is governed by the presence of suitable limestone caves. Animals such as the horse, rhinoceros, bison, and mammoth, together with a few tectiform and simple linear patterns, are found, and all belong to the Upper Palaeolithic. Rock engravings of the Mesolithic period with naturalistic representations of animals are known on the coast of Norway. In Sweden, N. of Gothenburg, are rock carvings of the full Bronze Age which include ships, agriculturalists using an ox-drawn plough, and a fight between armed men on horses. The bibliography is extensive and much of it consists of invaluable foreign studies. See in general M. C. Burkitt, *Prehistory*, 1925, and the various vols. pub. by the Institut de Paléontologie Humaine, Paris.

Rock-soap, or Saponite, black or nearly black mineral consisting of a mixture of aluminium silicate and iron oxide. It is a soft, friable substance with a greasy touch, and is used for the preparation of artists' crayons. Deposits are found in Saxony, Bohemia, Skye, and Autrin.

Rock Springs, city of Sweetwater co., Wyoming, U.S.A., 258 m. W. of Laramie. Lignite is found near here. Pop. 9800.

Rock Temples, religious buildings hewn out of solid rock, found in many parts of the world, notably in India, Ceylon, Egypt, Arabia, and China. There are also some interesting examples in the U.S.A., one being in Missouri near Salt R. Examples are to be found in India at Ellora and Elephanta, in Ceylon at Dambulla, in Egypt at Abu-Simbel (Ipsambul), in Arabia at Petra.

Rockville, city of Tolland co., Connecticut, U.S.A., 14½ m. N.E. of Hartford. It manufs. woollen and silk goods. Pop. 7600.

Rockwell Test, see METALLURGY, Metal Testing

Rocky Mount, tn. in Edgecombe co., N. Carolina, U.S.A., 50 m. N.E. of Raleigh. It has cotton mills and lumber works. Pop. 25,600.

Rocky Mountain Goat (*Haploros montanus*), a member of the *Bovidae* which occurs in N. America. It is intermediate in position between a goat and an antelope, the latter term is, however, used popularly and is without any precise zoological significance. The R. resembles a goat in size and has long white hair with woolly undercoat, black, hollow horns, compressed at the base, and short ears.



National Film Board Canada

THE ROCKIES, ATHABASKA GLACIER, JASPER PARK, ALBERTA

In the foreground, descending in zigzag formation, are men of the 101st Scouts Regiment in training during the Second World War.

Rocky Mountains, most important mt. system in N. America, traversing Mexico, Arizona, New Mexico, Utah, Colorado, Idaho, Wyoming, Montana, Canada, and

Alaska. It is the watershed of the Amer. continent, reaching from the Yukon R. in Alaska to New Mexico in the S., a distance of 2200 m. The chief ranges are Cœur d'Alène Mts., Bitter Root Mts., Salmon R. Mts., Big Horn, Black Hills, Crazy Mts., Shoshone Mts., Wahsatch Mts., Sawatch and Elk Mts. The chief peaks are Pike's Peak, Long's Peak, Gray's Peak, Mt. Harvard, Mt. Stephen, Blanca Peak, Mt. Massive (14,418 ft.), and Mt. Elbert (14,431 ft.), the highest of the system in the U.S.A. In Canada the highest peak is Mt. Logan (19,850 ft.) and in Alaska Mt. McKinley (20,300 ft.) and the volcano, Mt. St. Elias (18,008 ft.) In Colorado there are more than forty peaks over 14,000 ft. high. From this dist. northward the R. M. decrease in altitude as they contract in breadth. In the U.S.A. the N. group of mts. is divided from the S. by a broad depression in Central Wyoming, through which runs the Union Pacific railroad. In the system of the R. M. the following rise. Arkansas, Colorado, Columbia, Missouri, Platte, and Rio Grande. Among its special features are its gorges, canyons, and parks. Through the Kicking Horse valley pass the Canadian Pacific Railway crosses the R. M. at an altitude of over 5000 ft. A motor road crossing the range by the Vermilion pass also rises above 5000 ft. See also under CANADA, UNITED STATES OF AMERICA. See F. S. Smythe, *Rocky Mountains* 1918.

Rocky Mountain Sheep, see BIG HORN SHEEP

Rococo (Fr. *rocaille*, rock-work), in art, term denoting a florid debased form of ornament which succeeded the style favoured by Louis XIV and XV, and which exaggerated the chief features and peculiarities of that fashion. It is chiefly remarkable for the lavish abundance of its details, which are sometimes thrown together without propriety or logical connection. Scroll and shell ornaments are frequently used and sometimes rock-work pavilions, birds and fishes combined with enormous flowers. Derivatively, the term has come to mean bad taste in design or ornament generally, though good examples of R. exist.

Rocroi, tn. of N. France in the dept. of Ardennes, 2 m. from the Belgian frontier. It was besieged by the Spaniards in 1643, but they were defeated by the Fr. under Condé. R. was first fortified in the sixteenth century. The present fortifications, almost surrounding the tn., were built by Vauban. Pop. 2400.

Rod, Pole, or Perch, unit of lineal measure, equivalent to 5½ vds. or 16½ ft. It is largely employed in surveying, whilst a square rod, or rood (16½ × 16½ = 272¼ sq. ft.) is the usual measure employed in estimating brickwork.

Rode, Helge (1870-1937), Dan. poet, dramatist, and literary critic, b. in Copenhagen, son of a. n. of letters. His poetry has a religious quality and reveals him as a champion of modern mysticism. He was an opponent of materialism and of Darwin's theory of natural selection. Among his pubs. were *Hvide Blomster*

(1892); *Den Rejsende* (two series; 1900, 1929); *Solsagn* (1904); *Komedier* (1905); *Ariel* (1914); *Krig og Aand* (1917); *Moderen* (1921); *Theatret* (1922); *Regenerationen i nord Aandsliv* (1923); *Udvalgte Kritiker* (1923); *All er godt* (1928); and *Den vilde Rose* (1932).

Rodenbach, Georges Raymond Constantin (1855-98), Belgian poet and novelist, b. at Tournai, and educated at Paris and Ghent Univ. He became a barrister, spending most of his life in Paris, where he died. His main interest was poetry, however; he was a follower of the symbolist-impressionist school, and his poetry gives a fine impression of the passive melancholy of the Flem. countryside, which he knew well. Many of his works are idealisations of his youthful experiences of Flem. life. He gave a vivid study of Bruges in his novel *Brugsele-Morte* (1887). See lives by K. Glaser, 1917, and P. Maes, 1926.

Rodentia, large order of mammals, the largest of which does not exceed the size of a small pig, and many are among the most diminutive quadrupeds. The brain is relatively small, and the intelligence low. As a whole, their diet is vegetarian, and the characteristic dentition is so specialised that the teeth are an invariable guide to the identification of a rodent. There are only two kinds of teeth, incisors and grinders, and except in the rabbit and allied forms, which have an additional pair of rudimentary incisors, only two incisors are present. These have open roots, and continue to grow throughout the animal's life, being kept always sharp by the dentine, which forms the greater part of the tooth, being worn away more rapidly than the harder enamel which is left as a sharp front edge. Many R. are burrowers, some aquatic, and some arboreal, and many hibernate. Among the R. are the most destructive of man's enemies. Typical examples are the rats, mice, and squirrels.

Rodent Ulcer, form of progressive or 'gnawing' ulcer (hence the name 'rodent'), usually occurring near the eye, nose, or ear. The growth is malignant (cancerous), but is very slow in progression, taking years to advance to a dangerous degree. All kinds of tissue may be involved, but the cancer does not disseminate to other parts of the body, the ulceration being continuous throughout its course. The most certain treatment is excision of the part if that be possible. A large measure of success has attended the application of X-ray treatment to this form of tumour, especially where no great depth of tissue is involved. Large doses as measured by Sabouraud's pastilles are applied at fairly long intervals. Radium treatment is also effective; in the early stages good results are obtained by the use of carbon dioxide 'snow'.

Roderic (d. 711), last Visigoth king of Spain; he murdered, and usurped the throne of, Witiza in 710. His reign was very short, but is memorable as the epoch of the termination of the Gothic and the beginning of the Arab domination in Spain. He was defeated by the Arab

or Saracenic forces under Tarik which had invaded Spain to help Witiza's sons to regain the throne, in 711, at Xeres on the banks of the Guadalete, and was probably either slain in battle or drowned in his flight. He is the hero of Scott's *Vision of Don Roderick* and Southey's *Roderick the Goth*. See A. H. Krappe, *The Legend of Roderick*, 1926.

Rode-Saint-Genève, see SAINT-GENEVIÈVE-RODE.

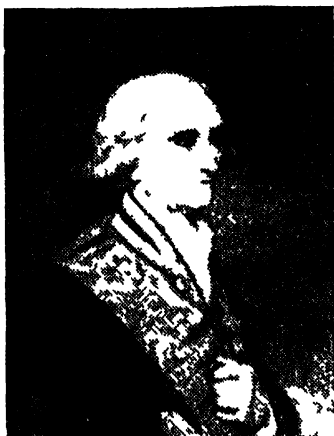
Rodewisch, tn. of Saxony, Germany, 14 m. S.W. of Zwickau; it has manufs. of textiles and hardware. Pop. 10,000.

Rodez, tn. of France, cap. of the dept. of Aveyron. It has a Gothic cathedral, begun in 1277, and the remains of a Rom amphitheatre. Cloth and linen are manu factured. R. was the Rom. Segodunum Pop. 20,400.

Rodin, François Auguste (1840 1917), Fr. sculptor and etcher, b. in Paris. At first he studied under Barre, but necessity drove him in 1864 to accept employment in the studio of Carrier-Bellasse, with whom he remained for six years. Here he acquired mastery of the technique of sculpture. After 1870, however, there was nothing to attract him in Paris; all art had been temporarily crushed by the siege. The following year he went to Brussels, where for six years he worked under Van Raskouge. Subsequently he returned to Paris, where most of his finest work was accomplished. Here he became the best-known and most successful sculptor of his day. His output reached prodigious proportions. Casts of his statues were purchased for collections all over the world. His most important works are on permanent view at the Musée R. in Paris, a building which was made available to R. at the height of his career. R.'s genius led him outside the old Gk. ideals. His modellines of the human figure are unsurpassed; the accentuation of muscles is characteristic; he produced a splendid depth of shadow, and the beauty of every curve was well brought out. At the same time the psychology of his subjects was expressed with a truth and conviction almost unparalleled in sculpture; the man's hands in 'The Kiss,' and the imprisonment of a hand or foot in the marble block in sev. of his pieces, are wonderful in their vivid portrayal of emotion and of spiritual significance. The influence of his work brought forth a school of vigorous naturalism, which has continued to inspire sculptors up to the present day. *Movement* is the pre-dominant feature of his sculpture. It lacks almost entirely the monumental calm of pre-classical Gk. sculpture, but is stable only in so far as it is a representation of arrested movement. The contemporary progressive school of sculpture has reacted strongly against R.'s conception of sculpture and has sought inspiration from primitive carving rather than the untiring observation of the human figure, which was the foundation of all R.'s work. He remains, nevertheless, unsurpassed in his power of vision and in the passionate humanity of his work, which has had a wider appeal than

that of any sculptor after his time. Some of his finest pieces are 'The Burghers of Calais' of which there is a replica in the Victoria Tower Garden, London. The brass 'St John the Baptist', 'David', 'Ivan the Thinker' (presented by Lord Gunthorpe to the Brit nation 1901), 'The Hand of God', 'The Prodigal Son', and 'The Gate of Hell', a colossal inspiration after Dante's *Inferno*. He made busts of Hugo, Bastien-Leprieux, Rochefort, Bartholot and Puvion de Lavannes. See lives by C. Black 1905, J. Cladel 1908, J. Kahn 1912, C. Maclair 1918, A. M. Ludovic 1926, E. Waldmann 1915, R. M. Pilke (Eng trans 1916), and Phaidon Press *Rodin* 1949.

Rodman, Thomas Jefferson (1815-71). A mer military officer was b at Salem, Indiana. He invented the R gun which is cast on a hollow core, the metal being cooled by a stream of water running through the inside.



LORD RODNEY

Rodney, George Brydges Rodney, first Baron (1719-92). Eng sailor b in London. He entered the navy in 1742 and in ten years rose to the rank of captain. In 1774 he took part under Hawke in the action against the 11 under De la Penne off Rochelle and was highly commended. He was promoted rear admiral in 1779 and in July of that year bombarded Havre and destroyed the flotilla designed for the invasion of England. At the close of 1779 when he had been advanced to the rank of admiral he accepted the command of the Leeward Is station but on his way encountered the Sp fleet off Cape St Vincent and defeated it. His famous naval victory of the Battle of the Saints over the combined Fr and Sp fleets secured to England her W Indian colonies. The battle was fought off Dominica on April 12 1782. The opposing fleets, the Eng under R and Hood and the Fr under de Grasse, were in single

line ahead on parallel but opposite courses when R, seizing his opportunity, executed the brilliant manoeuvre famous ever after of breaking the enemy's line. By thus dividing the enemy's fleet into two portions which could not afford mutual support he secured a complete and signal victory but refused to pursue the enemy. He was raised to the peerage and granted a pension of £2000 a year for himself and his successors (commuted 1924). See also *SIXTH BATTLE OF*. See lives by G. B. Mundy 1830, and D. Hannay 1891.

Rodosia or Tekir Dag, tn of European Turkey on the sea of Marmora 78 m W of Istanbul cap of it of the same name (pop 204,000). It exports cereals, cotton, wool, silk and silkworms eggs and cocoons. Pop 30,000.

Rodriguez, Ventura (1717-95). Sp architect b at Cazorla. His reputation in Spun was very great. He built churches, colleges, hospitals and palaces in the chief tns including Madrid, Saragossa, Toledo, Granada and Malaga. Among his works are the palace of the duke of Infantado in Madrid, the famous figure of St James in the cathedral at Santiago, the Corinthian facade of Pamplona Cathedral and the church of St Philip de Neri at Malaga. He combined the styles of late baroque with the beginnings of classicism.

Rodriguez or **Rodrigues** is in the Indian Ocean 300 m E of Mauritius of which it is the most important dependency. It is under the administration of a magistrate, who takes his orders from the governor of Mauritius and is a station on the cable route between S Africa and Australia. Cattle, beans, salt fish and goats are the prin exports. Area 42 sq m. Pop 11,900.

Roe, Richard, and Doe, John, see 1110N. **TREATY OF RECOVERY OF LAND**.

Roe, Sir Thomas (1581-1644). Eng traveller and diplomat b at Low Leyton, Essex and educated at Magdalen College, Oxford. He received a court appointment in 1603 and was knighted two years later. In 1610 he sailed up the Amazon and Orinoco and made other voyages to this area in later years searching for gold. In 1611 he went as Eng ambas to the Mogul court where he established foundations of Eng power in India by obtaining privileges for Eng merchants there. Later he was ambas at Constantinople and undertook missions to Poland, Sweden and Germany. He was M.P. for Tamworth in 1614 and for Oxford Univ in 1640. He is a striking example of the close link between commerce and politics in the early seventeenth century, and his life illustrates the versatility of the Jacobean gentleman. A revised ed of his *Journal* was pub in 1917 (ed Sir W. Foster).

Roebourne, tn of W Australia 750 m N of Perth, at about mid inland. It has pearl fishing and is also found in the neighbourhood. Pop 100.

Roebuck, John (1718-91). Brit chemist, b in Sheffield. He took a degree in medicine at Edinburgh Univ and became a

medical practitioner in Birmingham. He made scientific experiments in his spare time, and invented the first commercial method for manufacturing sulphuric acid, the lead chamber process, in 1746. Later he helped to found the iron industry in Scotland.

Roebuck, John Arthur (1801-79), Eng. politician, *b.* at Madras and educated in Canada. He settled in England, and was called to the Bar in 1831. In the following year he entered Parliament. He held radical views, and among his projects was a forerunner of the Asquith Parliament Act, limiting the veto of the House of Lords. He was an independent member, but in sympathy with the Radicals, and became an original member of the Reform Club (1836). In 1855 he moved for an inquiry into the conduct of the Crimean war, and was thus instrumental in bringing about the fall of the Aberdeen ministry. Later he abandoned his alliance with the Radicals, and supported Disraeli's R. policy. *See* life by R. E. Leader (1897).

Roedean School, public school for girls, near Brighton, England, founded in 1885. The first buildings were in Kemp Tn., Brighton, but in 1898 the school moved to a new site 3 m. E. of the tn. In 1938 R. was incorporated by royal charter. It is governed by a council. The school is divided into junior and senior depts., and there is accommodation for 380 pupils.

Roedeer (*Capreolus caprea*), small deer, native to Britain, where a few still survive in a purely wild state, though many are preserved in Epping Forest, New Forest, and elsewhere. The buck stands about 26 in. at the shoulder, and is 48 in. in length, from the nose to the tiny tail. The colour in summer is red-brown, in winter the redness disappears, and the underparts are yellowish-grey. The young at first are reddish-brown with white spots. The horns average about 8 in. in length with points. Rs. are stalked with the rifle from June to Aug., the venison is somewhat inferior. The mating season is in July to Aug.; the young are born in the following May and June.

Roehm, Ernst, *see* ROHM.

Roe, see RUHR.

Roelants, Maurice (b. 1895), Flem. poet and novelist, *b.* at Ghent. He is one of the few outstanding Flem. authors of the period between the two world wars. His subtle and melancholic poems are full of sympathy with suffering humanity: *Het eerszaken* (1930) and *Pygmalion* (1947). In his novels he shows himself a fine psychoanalyst: *Komen en gaan* (1927); *De Jazz-Speler* (1928); *Het Leren dat wij droomden* (1931); *Alles komt vrucht* (1937); and *Altijd op nieuw* (1943). Some of his works are transl into Fr., Ger., and Eng.

Roermond, tn. in Limburg, on the Meuse, 26½ m. N.E. of Maastricht. The chief industries are the manuf. of cotton and woollen goods and tobacco, and dyeing. There is some fine carving in the thirteenth-century minster. R. was the objective of very severe attacks by the Allies against the Gers. in Nov. and Dec. 1944. Pop. 21,000.

Roeselare (Fr. *Roulers*), tn. in W. Flanders, Belgium, 12 m. N.W. of Courtrai. A famous weaving centre in the Middle Ages, it now cultivates flax and manufs. lace, linen, gloves, carpets, pottery, tiles, and chicory. It is situated on the R. Mandel, a trib. of the Lys, and is connected with the latter by a canal. During the Second World War R. was an important Ger. communications centre and suffered much from repeated allied bombing. Pop. 31,800.

Roskilde, or **Roskilde**, seaport on the R. Fjord, is. of Zealand, Denmark, 20 m. W. by S. of Copenhagen. Until 1443 this tn. was the cap. of Denmark, and its cathedral, dating from the eleventh century, contains the tombs of the Dan. kings. Pop. 14,000.

Roestone, *see* OÖLITE.

Rogaland, administrative div. (Norwegian *fylke*) of S.W. Norway. It is a densely forested area. Stavanger (after which the div. was named until 1919) is the cap. and port. Area 3515 sq. m. Pop. 199,000.

Rogation Days (Lat. *rogare*, to ask), April 25th and the three days preceding Ascension Day, so-called because the Litany is on these days chanted in procession. The practice has continued down to the present day in the Rom. Catholic Church, and has been extensively revived in recent times in the Eng. Church.

Roger I. (1031-1101), count of Sicily, *b.* in Normandy. In 1058 he went to Italy and succeeded in obtaining Calabria for his brother, Robert Guiscard. In 1060 he journeyed to Sicily, and there conquered the Saracens, eventually being made count of Sicily by his brother, to whose possessions he succeeded after his death in 1085. *See* life by E. Curtis, 1913.

Roger II. (c. 1093-54), king of Sicily, son of Roger I. (q.v.). In 1127 he became the ruler of Apulia owing to the death of Robert Guiscard's grandson, and this he added to his domains of Calabria and Sicily. In 1139 he captured Pope Innocent II., and the conditions of his release secured R.'s recognition as king of Sicily. He also attacked the Byzantine Empire in 1146, and conquered parts of Greece and Africa, importing from the former country workers in the silk industry. *See* life by E. Caspar, 1904.

Roger de Coverley, Sir, type of an Eng. country gentleman as portrayed by Steele (q.v.) and Addison (q.v.). He was the chief character in the club professing to write the *Spectator*. The dance which was invented by the great-grandfather of Roger de Coverley, or Roger of Cowley, near Oxford, is named after him.

Roger of Salisbury (d. 1139), Anglo-Norman cleric and justiciar, the most noted member of a family of 'curiales-bishops.' He was originally a priest of Caen. The chronicler states that he attracted Henry I.'s attention by the speed at which he could say mass. R. became Henry's chaplain, and, after Henry's accession, was made chancellor, bishop of Salisbury, and justiciar. He is said to have created the elaborate system of the medieval Eng. exchequer described

in the *Dialogus de Scaccario* by Richard Fitz-Nigel, treasurer from 1160 to 1198; if his actual role was less definite, it seems certain that he played a vital part in the systematisation of the financial machinery. His power became very great, and when Stephen rashly attempted to curb his family's privileges, R. was able to swing the weight of Eng. eccles. opinion decisively against him. R. was efficient, ruthless, and extremely acquisitive, but there is little evidence that he had any real religious zeal, though under his episcopate Salisbury Cathedral was much enlarged. See W. Stubbs, *Select Charters of English Constitutional History*, 1870, and R. L. Poole, *The Exchequer in the Twelfth Century*, 1912.

Roger of Wendover (d. c. 1236), chronicler and monk of St. Albans. His chief work is the *Flores Historiarum* (ed. by H. G. Hewlett, 1886-89).

Roger, Pierre, see GREGORY (popes), Gregory XI.

Rogers, James Edwin Thorold (1823-1890), Eng. political economist, b. at W. Meon, Hampshire, and educated at King's College, London, and at Oxford, becoming Drummond prof. of political economy there (1862-67). His chief works are *History of Agriculture and Prices in England* (1866); *Six Centuries of Work and Wages* (1885); *First Nine Years of the Bank of England* (1887); *The Economic Interpretation of History* (1888). His theories on fourteenth-century England have been largely discredited by later historians.

Rogers, John (c. 1500-55), Eng. martyr, b. at Aston, Birmingham. In his youth a priest, he was converted to Protestantism at Antwerp, becoming a pastor at Wittenberg (1537). Under Edward VI. he held various appointments in London and was a prebendary of St. Paul's. He was imprisoned for his views and outspoken preaching in Mary's reign, condemned by Gardiner and Bonner, and burned at Smithfield. R. prepared 'Matthew's' Bible from the version of Tyndale and Coverdale. See life by L. Choster, 1861, and J. Foxe, *Acts and Monuments*, 1563.

Rogers, Samuel (1763-1855), Brit. poet and conversationalist, b. at Stoke Newington. He entered his father's bank, becoming head of it in 1793. In 1781 he began to contribute verses to the *Gentleman's Magazine*. In 1792 he pub. *The Pleasures of Memory*, and among his other works were *Columbus* (1810), *Jacqueline* (1814), and *Human Life* (1819). He was highly esteemed as a poet by contemporaries, and in 1850, on the death of Wordsworth, was offered the laureateship, which he declined; but his work is not now widely read. He is remembered chiefly as a conversationalist; his breakfast parties were famous, and Fox, Sheridan, Moore, Byron, and Wordsworth were among his friends. At his house in St. James's Place, overlooking the Green Park, he began a famous art collection and library. His literary work lacks original inspiration but has style and taste. His *Recollections* were pub. in 1856, and his *Table-Talk* four years later. See life by P. W. Claydon, 1889.

Rogers's Pass, mt. pass in Brit. Columbia, Canada, by which the Canadian Pacific Railway crosses the Selkirk Mts. Height 4275 ft.

Roget, Peter Mark (1779-1869), Eng. physician and lexicographer, b. in London and educated at Edinburgh Univ. He became prof. of physiology at the Royal Institution, but is chiefly remembered as the author of a *Thesaurus of English Words and Phrases* (1852). This was enlarged by his son J. L. Roget (1879). R. also wrote an introductory *Lecture on Human and Comparative Physiology* (1826); treatises on *Electricity, Galvanism, Magnetism, and Electro-Magnetism* for the library of *Useful Knowledge* (1832); and *Animal and Vegetable Physiology considered with reference to Natural Theology* (1834). In 1821 R. discovered the phenomena of persistence of vision. He also helped to establish a univ. in London.

Roggeveld, mt. range of S.W. Cape of Good Hope, forming part of the watershed between the Ollant's and Orange R's. The range (100 m. long, 5000 ft. high) continues E. into the Nieuwveld range.

Rogier (Roger) van der Weyden, or **Rogier de la Pasture** (c. 1400-64), Flem. painter, b. at Tournai. In 1436 he became official painter to Brussels city. In this capacity he painted the altar-piece for the Chamber of Justice in the *hôtel de ville*. This was destroyed in the seventeenth century, but accounts make it clear that already the naturalist characteristics of R.'s main works were apparent, though the subject, the story of Herkenbald, was quite medieval. R.'s 'Last Judgment' is in the museum of the hospital at Beaune. Authorities consider that he may have had the help of Dirk Bouts and Memline in this painting; the portraiture is superb, and the skilful composition and rich colouring place it among the finest of R.'s work. It was perhaps more of a medieval painter than the Van Eycks. He expressed naturalism within the framework of the conventional subjects, and evolved a new technique of composition and proportion, while retaining the traditional scenery, expressions, and postures. He combined the realism of the N. Renaissance with the symbolism of the Middle Ages. In his ability to portray suffering R. surpasses all his Flem. contemporaries. It was under his influence that the realistic tendencies of the Van Eycks pervaded Germany. See lives by F. Winkler, 1913; J. Huizinga, 1930; J. Desfrée, 1930; O. Kerber, 1936; and E. Fiddler, 1938.

Rogue, see VAGRANTS.

Rogue Money, in old Scots law, co. assessment, now abolished, to defray the cost of arresting, prosecuting, and maintaining criminals.

Rohan, name of a famous Fr. family with many distinguished members. The name is derived from R., a small tn. in Brittany. The best-known members of this family are

Henri, Duc de Rohan (1579-1638), Fr. Protestant soldier, b. at Blain, Brittany. He led the Fr. Huguenots in their insurrections against the Catholics. He married

the daughter of Sully, the minister of Henry IV. He was made marshal of France by Louis XIII., and has left memoirs describing his campaigns, ed. by von Zurlauben, 1758.

Louis René Edouard, Prince de Rohan (1734-1803), Fr. cardinal and diplomat, b. in Paris, and educated at the St. Magloire seminary. His uncle, Constantin de R., bishop of Strasburg, chose him as his coadjutor. He was ordained in 1760 as bishop of Canope in *partibus*. He was made ambas.-extraordinary at the court of Vienna, but alienated the favour of Maria Theresa by the scandalous and extravagant mode of living which he adopted, and was recalled from Vienna. His name is associated with the affair of the diamond necklace, in connection with which he was imprisoned.

Other members of the R. family included *Hercules de Rohan*, duke of Montbazou, and *Armand de Rohan*, the cardinal of Soubise (see SOUBISE).

Rohilkand, or **Rohilkund**, div. of the United Provs., India, bounded by the Ganges on the W. and S. and the Himalayas on the N. and N.E. It is a flat, fertile dist., and takes its name from the Rohillas (q.v.). The cap. is Bareilly. Area 10,829 sq. m. Pop. 6,196,000.

Rohillas, Pathan hill tribe of Afghanistan who, in the middle of the eighteenth century, raided and settled in Rohilkhand, India. The ruler of Oudh, with the assistance of the East India Company, succeeded in expelling them in 1774. They were expert horsemen. See Sir J. Strachey, *Hastings and the Rohilla War*, 1892.

Röhm, or **Roehm**, Ernst (1887-1934), Ger. politician, b. at Munich. He became a professional soldier, and was commissioned just before the First World War. Later he was involved in von Epp's plot against the left-wing gov. at Munich. He was one of the original members of the National Socialist party, and an intimate friend of Hitler. He was jailed for his part in the *putsch* of Nov. 1923, and afterwards went to Bolivia and served in the army there. In 1931 he became Hitler's chief of staff and leader of the S.A. and S.S. He was shot during the purge of June 30, 1934, on charges of plotting against Hitler (q.v.).

Rohtak, tn., cap. of R. dist., of E. Punjab, India, 42 m. N.W. of Delhi; it manufactures cotton turbans. Pop. 38,000. Area of dist. 1797 sq. m. Pop. 956,800.

Rols Fainéants, Les, see FAINEANTS.

Rokol, see ROCKALL.

Rokossovsky, Konstantin (b. 1887), Russian soldier, b. in Warsaw, which he left in 1914 as a Russian conscript. During the revolution of 1917 he joined the Bolsheviks. At the outbreak of hostilities between the Soviet Union and Germany in 1941, R., as a Lieutenant-general, commanded one of the armies defending Moscow. R. later commanded the divs. that encircled the army of von Paulus at Stalingrad (Nov. 1942-Jan. 1943). His group of armies took a leading part in the Russian summer-offensive of June 23-Aug. 31, 1944, planned in opera-

tional liaison with the W. allies, R.'s armies being concentrated in White Russia in the Pripiet marshes. His great victory in these operations was that of Bobruisk where, in five days' fighting on the S. part of the central zone, he utterly defeated the Ger. Ninth Army. For this great success and masterly manoeuvring he was promoted marshal of the Soviet Union. R. was in command of the Soviet armies on the Vistula at the time of the Polish underground rising under Gen. Bor in Warsaw, when requests from the Brit. and Amers. for the use of Soviet airfields for supplying the insurrection were refused. He directed operations in Poland and took part in the conquest of E. Prussia, as commander of the First and Second White Russian armies. In 1949 he was made a marshal of Poland on his appointment as minister of national defence in the Polish Gov., and was co-opted into the central committee of the United Workers' Party.

Rokycana, Johannes (c. 1397-1471), Bohemian Calixtine or Utraquist (name given in 1420 to the Calixtines because they received the Eucharist in both kinds), leader, b. at Rokycany. In 1433 he was a Bohemian delegate at the Council of Basle, and became rector of Prague Univ. in 1438. His life was devoted to an attempt to achieve a reconciliation with Rome, while preserving the essentials of Utraquism.

Roland, *Chanson de*, epic poem of the Carolingian cycle, dating from the eleventh century. Its lofty and courageous tone marks it out as the greatest heroic poem of the Romance period. It is probably of Norman origin. The earliest existing copy is in the Bodleian Library, but the theory which has been advanced that this is the original MS. has been refuted. The story related in the *chanson* deals with the battle of Roncevaux, here represented as a piece of strategy on the part of the Saracen king, Marsile, who planned thereby to kill Roland, the hero of the *chanson*, and nephew of Charlemagne. In this he is successful, and Roland, Oliver, and Archbishop Turpin perish after making a gallant stand against the enemy. Before he dies R. blows his ivory horn, which Charlemagne hears, though he is thirty leagues away. He hastens to the scene with his army, but is too late to save his nephew, though he avenges his death by inflicting defeat on the Saracens. See modern Fr. ed. by L. Gauthier (Eng. trans. by C. Scott-Moncrieff, 1920).

Roland, Holst-Adriaan (b. 1888), Dutch poet, b. at Amsterdam. He lives near the sea, and spent much of his youth in England. Both these circumstances have had great influence on his works. The rhythm is broad, his main symbols are the wind, the rain, the water, and the gulls. Among his works are *De Bekijden van de Stille* (1913); *Voorbij de Wegen* (1920); *De wilde Kim* (1925); *Een Winter aan Zee* (1937); *Tegen de Wereld* (1947); and *In Ballingschap* (1948).

Roland Holst-van der Schalk, Henriëtte (b. 1869), Dutch poet, b. at Noorderwijk,

near Leyden. She is without doubt the greatest living woman poet of the Low Countries. She was a zealous adherent of the Socialist cause, and later became a member of the Dutch Communist party. Finally when she grew disillusioned the mystic-religious character of her poetry predominated. Always, however, her work was of extraordinary lyrical value. Her most important pubs. are *De Vrouw in het Woud* (1913); *Verzonken Grenzen* (1918); *Tusschen twee Werelden* (1923); *Tusschen Tijd en Eeuwigheid* (1934); *Uit de Diepte* (1946); and *Een Regtlem voor Ghandi* (1948). She has also written sev. biographies, studies on social subjects, and dramas in verse.

Rolandseck, vil. of the former Ger. prov. of Rhineland, Germany, on the l. b. of the Rhine, opposite Honnef. Near by are the ruins of the old castle of R., standing 340 ft. above the riv.

Rolland, Romain (1866-1944), Fr. author, b. at Clamecy, and educated there and at the Ecole Normale, Paris, and, later, in Rome. He returned to the Ecole Normale as lecturer on the hist. of art, and in 1903 went to the Sorbonne as prof. of the hist. of music. It was in musical hist. indeed that he achieved his first great success with his life of Beethoven (1903). This paved the way for the pub., in 1904, of the first of his studies of the life of the imaginary Jean Christophe, evolved from the ideals of the period of Ger. culture represented by Beethoven and Goethe. It described them as 'the tragedy of a generation that has disappeared.' Ten vols. came out between 1904 and 1912. For this remarkable work R. was awarded the Nobel prize for literature in 1915 and the Fr. Academy's Grand Prize for literature. During the First World War he occasioned much controversy, especially by his *Au-dessus de la mêlée* (1915) and other collections of articles in the *Journal de Genève*, in which his uncompromisingly pacifist efforts to judge the war objectively led to accusations that he was pro-Ger. After the war he turned to irony, either a light, lambent irony as in *Liluli* (1919), or the more serious irony of *Clerambault* (1918), the 'history of a free conscience during the war.' But bitterness was not in his nature, as is shown in the tender sentiment of his love story *Pierre et Lucie* (1919), and in the noble compassion of the study of the Gk. philosopher in Empedocles, in *Empedocle d'Agrigente et l'âge de la haine* (Paris, 1918).

Later books on the Indian thinkers and religious leaders, such as his *Mahatma Gandhi* (1924), were widely read in the E. but were less known in France. Of his plays both *Danton* (1901) and *Le 14 Juillet* (1902) could be appreciated by select Fr. audiences, but the Fr. as a whole did not regard them highly, perhaps owing to their didactic tendencies. His *Charles Péguy* (1942) presents, in a masterpiece of writing, all that is best in the life and work of the great Fr. moralist and critic. See lives by J. Bonnerot, 1921; S. Zweig, 1921; and C. Sennéchal, 1933.

Rolle, Richard (c. 1300-49), Eng.

hermit, poet, and mystic, b. at Thornton, in Yorkshire. Though a brilliant scholar (he studied theology at Oxford) he forsook the barren scholasticism of the univ. of his day and became a hermit at Hampole, near Doncaster, describing his mystical experiences both in lat. and the vernacular. He typified the fourteenth-century desire to gain religious satisfaction through faith, rather than by way of the hair-splitting dialectic of the schools. His vernacular writings are extremely beautiful, and his treatises in Eng. and trans. of the Psalms were widely read by laymen. The ardour and splendour of R.'s mystical writing is rivalled by the *Revelations of Divine Love* of Dame Julian of Norwich (c. 1342-1413 and after). His Eng. writings have been ed. by Hope E. Allen (1931). See life by Francis M. M. Cowper, 1929, and T. W. Coleman, *English Mystics of the Fourteenth Century*, 1938. See also Grace Warrack's ed. of *Revelations of Divine Love*, with prefatory note to 13th ed. (1949) by P. F. Chambers.

Roller Bearing, see under BALL BEARINGS.

Rollers, name given to any species of Coraciidae in the sub-family Coraciinae, on account of the curious habit of both male and female birds of rolling over when in flight. These birds occur exclusively in the Old World, and are found in the woods of hilly districts.

Roller Skating, see under SKATING.

Rolleston, Sir Humphry Davy (1862-1944), Brit. physician, b. at Oxford and educated at Marlborough and St. John's College, Cambridge. He received his medical training at St. Bartholomew's Hospital. R. became distinguished as a pathologist and as the editor of Allbutt's *System of Medicine*. His other major editorial work included *The British Encyclopaedia of Medical Practice*, pub. 1936, and the main direction of the medical periodical *Practitioner* from 1928. He was president of the Royal College of Physicians from 1922 to 1926, and succeeded Sir Clifford Allbutt as regius prof. of physic at Cambridge in 1925. He was physician-in-ordinary to King George V. from 1923 to 1932, and physician-extraordinary from 1932 to 1936. Created a baronet in 1924, G.C.V.O. in 1929.

Rolleston, Thomas William (1857-1920), Irish author, b. at Glas-house Shinnrone, O'ahy, and educated at Rathfarnham and Trinity College, Dublin. He played a leading part in the Irish literary revival: he was joint editor of *The Treasury of Irish Poetry* (1900) and pub. *Imagination and Art in Gaelic Literature* (1900) and *Myths and Legends of the Celtic Race* (1911). Other pubs. include a life of Lessing (1889).

Rollier, Augusto (b. 1874), Swiss physician, b. at St. Aubin. R. was a pioneer in the treatment of tuberculosis by heliotherapy, and his clinic in Leysin gained a world famous reputation.

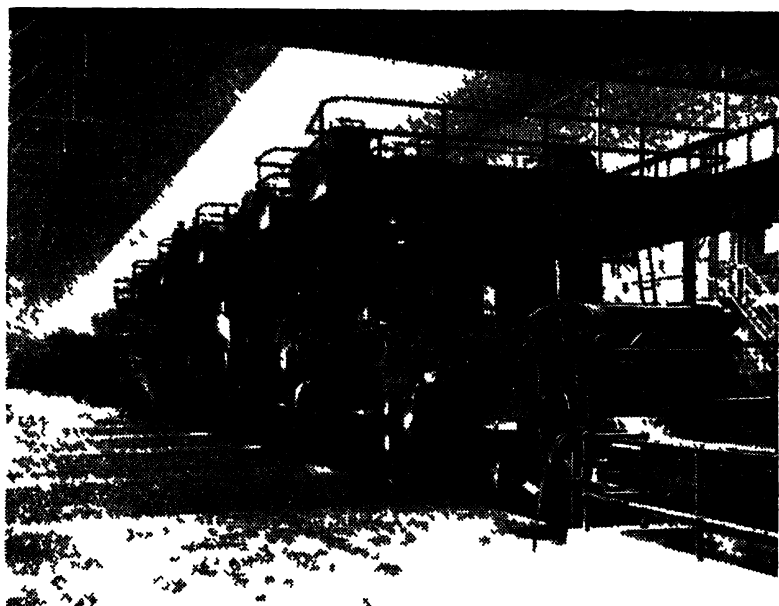
Rollin, see LARIV-ROLLIN.

Rollin, Charles (1661-1741), Fr. historian, b. in Paris. In 1688 he became prof. of eloquence in the Collège de France, and in 1694 rector of the univ. of Paris,

to which he was re-elected in 1720. He exercised great influence on European thought and life. He published an edition of Quintilian (1715), *Traité des études* (1726, 1731), and *Histoire ancienne* (13 vols., 1730-38).

Rolling Mills In early times malleable iron was generally hammered down into shape and the important advantages occurred when R. M. were used to replace the older water tilt hammers and steam hammers. Although modern rolling may

Swede by the name of Polhem suggested placing two small rolls between two large ones thus anticipating the modern four high mill fully 200 years before it had received any considerable attention. The only other outstanding advance in the design of rolls prior to the steel mill is Cort's invention. Both for driving the tilt hammer and turning the R. M. the discoveries of James Watt and subsequent workers caused the development of the steam engine, which has been the main



Richard Thomas & Baldwins Ltd

ROLLING MILL

The six stand continuous hot strip mill — the last stage of rolling on the half mile long hot mill at Ibbw Vale works

be said to have commenced with Cort's invention of grooved rolls in 1784 the rolling was practised for many years before this. There is evidence that a Frenchman Brulier passed gold and silver between rolls in 1573 in order to ensure an even thickness. In 1610 de Caus erected a mill to roll sheets of tin and lead for organ pipes. Like all other primitive processes these mills were driven by hand power. Bianca a Roman engineer designed a power driven mill in 1629. It is doubtful if it ever worked but the idea of using the hot air currents from a blacksmith's forge to drive a wheel, and further to use gearing to assist, was ingenious. In 1728 John Payne and Maj Hanbury of Pontypool were granted a patent for rolling tinplates, instead of the previous method of hammering. Early in the eighteenth century a

source of power for driving mills during the past century.

When steel making commenced the engines employed were all of the beam type running at low speeds with low pressure steam usually throttled by small pipes and faulty valves so that in spite of their imposing dimensions they really gave very little power. In order to prevent the mill being pulled up or 'stalled' as the men call it a heavy flywheel was necessary. As a consequence these early mills were an imposing sight but were not capable of much hard work. The beam was replaced by direct acting engines in which the crankshaft was connected straight through to the main shaft of the rolling mill. Subsequent developments of mill engines using steam for steel-works rolling have taken place along the lines of the two and three cylinder high-

pressure type. In some cases compound steam engines are in use.

Electrically driven reversing motors for 'cogging,' that is the first stage of roughing down the ingot, were first tried in Austria in 1850 and have found extensive application in modern steelworks. Modern practice is based almost exclusively on the use of electrical power. These developments have probably constituted the outstanding features of importance in steel and non-ferrous metal-rolling practice.

Rollo, see under **NORWEMEN**.

Rollright, Great and Little, two adjacent vills. In the co. of Oxfordshire, England, 11 m. S.W. of Banbury. Between Great R. and Little R. are the R. Stones, a famous megalithic structure, consisting of the King Stone, the King's Men, and the Whispering Knights. The King's Men is a circle of some seventy standing stones; the Whispering Knights is the remains of a burial chamber. There is interesting folklore about each. See T. H. Ravenhill, *The Rollright Stones*, 1932.

Rolls, Henry Charles Stewart, see under **ROLLS-ROYCE LTD.**

Rolls, Keeper of the, see **CUSTOS ROTULORUM**.

Rolls, Master of the, keeper of the records and head of the Record Office, ranking after the lord chancellor and the lord chief justice of England. Originally an officer of the court and chief of the masters in chancery, he is now the president of the chancery div. of the high court of justice in England. He was formerly capable of being elected an M.P., but this privilege was abrogated in 1873.

Rolls-Royce Ltd. Henry Royce (1863-1933) and the Hon. C. S. Rolls (1877-1910) first met in 1904 when the firm of F. H. Royce and Company was in being, producing Royce cars to the design of the great engineer. The firm of C. S. Rolls & Company were at that time well estab. in London, as dealers in high-grade continental cars, but with the advent of the Royce car they changed their policy and in 1906 they founded R.-R. Ltd. The first R.-R. factory was built at Derby and opened on July 9, 1908. The floor space of some 18,000 sq. ft. has now grown to 382,000 sq. ft.

As the fame of the car spread throughout the world depots were opened in many countries, each in the charge of men trained in Derby. During the First World War contracts were accepted for the design and manuf. of complete aero engines. The first R.-R. aero engine, the 'Eagle,' was an outstanding success and it has been estimated that more than half the aero engines in service in the First World War were of R.-R. design and manuf.

Between the wars the company prospered in many directions, other factories were built in the Derby area, and a flight development estab. was started at Hucknall, Nottinghamshire. In 1938 the Air Ministry asked R.-R. to build a large factory for the production of Merlin aero engines, and factories were built at Crewe and Glasgow. Before the end of the

Second World War the personnel employed totalled 57,000. It is now well known that R.-R. played an important part in the development of the Whittle jet-propulsion aero engine. R.-R. jet-propulsion engines to the Whittle design were in operational service during the last year of the war and are now manufactured under licence in the U.S.A., Australia, France, Argentina, and Belgium.

Roma, Rom. goddess, personifying the power of Rome, or rather the *Fortuna populi Romani* or τυχη Ρωμαίων. The origin of this cult was due to oriental and Hellenistic influences; it was long in establishing itself in Rome. Hadrian built a *templum urbis* to Venus and R. in Rome. In Asia Minor the cult of R. was estab. as far back as 195 B.C., when Smyrna built a *templum urbis Romæ* (Tacitus, *Annales*, iv. 56); Alabanda (Caria) in 170 B.C. had not only a temple of R., but also introduced the R. festivals and athletic sports, known as *Ρωμαία*, which later on were instituted in many cities of Greece (Athens, Chalcis, Mantinea, Egina, and others), Asia Minor (Pergamum, Magnesia, etc.), and Italy (Naples). Augustus, who reorganised the *commune civitas*, officially introduced the cult of R. in the municipalities of Asia Minor. The temple of R. at Athens is assigned to the period of Augustus (*Inscr. Græc.* iii. 1, 63). On the acropolis of Puteoli (modern Pozzuoli, prov. of Naples) there was a temple dedicated to R. and Augustus. On coins R. is portrayed as a warrior maiden accompanied by the goddess of victory.

Rolls of Parliament, see **RECORD OFFICE**.

Romagna, the N.E. part of the former papal states, Italy, comprising the modern provs. of Bologna, Ferrara, Forlì, and Ravenna, forming the region of Emilia-Romagna (*q.v.*).

Romano (Ρωμαϊκος, Rom., Byzantine), vernacular language of modern Greece, akin to the popular dialect developed before the fall of the Byzantine Empire. Prodrômus wrote in this tongue in the twelfth century. See C. Krumbacher *Geschichte der byzantinischen Literatur* (2nd ed.), 1897, and R. Nicolai, *Geschichte der neugriechischen Literatur*, 1876.

Romains, Jules (b. 1885), Fr. author, b. at St. Julien-Chapteuil, his real name being Louis Farigoule. He graduated from the École Normale Supérieure, Paris, and taught philosophy for ten years. In his early years he belonged to the group of young poets known as the 'Groupe de l'Abbaye.' R. was a founder of *Unanimité* (*q.v.*) on which he wrote *La Vie unanime* (1908), a vol. of poems. R. became a successful playwright, showing technical skill and the ability to produce sophisticated, sparkling comedy, as in *Knock* (1923). But his outstanding achievement was as a novelist, with his series *Les Hommes de bonne volonte*, which extended to 27 vols. between 1932 and 1941. This was in fact a 'continuous novel' attempting to survey realistically the whole panorama of contemporary life. The main characters appear, temporarily vanish, and reappear again at a later vol., an attempt to portray

life objectively on a grand scale. R. went to America during the Second World War. In 1942 he pub. a life of Stefan Zweig, and again turned to drama in *Salsette discovers America* (1942), a play which shows Shavian influence. See A. Cuisenier, *Jules Romains et l'unanimité*, 1933, and P. Brodin, *Les Écrivains français de l'entre-deux-guerres*, 1945.

Roman, or Romanu, tn. of Moldavia, Rumania, chief tn. of the dept. of R., at the junctions of the Rs. Moldava and Sereth. There is a magnificent sixteenth-century cathedral, R. being the seat of a Gk. Orthodox bishop. Pop. of dept. 140,000. Pop. of tn. 28,000.

Roman Army. The backbone of the R. A. was, and remained until far into the third century A.D., the legion (q.v.). At the end of the second century B.C. the legions were each 4500 strong, composed of thirty maniples, each divided into two centuries of heavy infantry, 3000 in all; 1200 *velites* or light infantry; and 300 cavalry. A major reorganisation is attributed to Marius (q.v.). He abolished the two troops (*velilla*) of cavalry belonging to the legions, and also the category of *velites*, whose role of skirmishers was now taken over by auxiliary infantry cohorts. The number of colonels (*tribuni*) was increased from six to ten, and their commands were no longer the *quincunx* of five maniples with attached *velites*, but the uniform, homogeneous cohort of 600 men or six centuries. The century of not quite 100 infantry became the tactical unit instead of the maniple which, however, was retained for some administrative purposes. This organisation remained substantially the same until the time of Diocletian (A.D. 284), except that Augustus incorporated a single *velillum* of 120 horsemen into each legion; however, they acted not as cavalry but as dispatch-riders and mounted orderlies. Under Augustus the legion was no longer commanded in rotation by the tribunes, but permanently by a general (*legatus*) of consular rank. Tribunes were of equestrian rank. Centurions rose from the ranks and their promotion was advanced by the command of all the sixty centuries in turn, beginning with the lowliest, that of the second century of the tenth maniple of *hastati*, and ending with that of the first century of the first maniple of *triarii*, which was the most honorific. By the time a centurion had reached this stage of his career he was too old for further promotion, and all he could hope for if he stayed in the army was the appointment of camp commandant (*castrorum praefectus*). In practice the higher ranks were only open to young men of good family who entered the service as tribunes. Besides the legions Augustus also raised the *cohortes praetoriae*, of which there were nine—partly stationed permanently in Rome and partly accompanying the commander-in-chief wherever he went. Internal security was provided by cohorts of *vigiles*, who acted as police and firemen and were stationed both in Rome and in the larger prov. tns.* Under the earlier emperors there was no great mili-

tary power inimical to Rome and therefore no need for a field army. Apart from the praetorians and the *vigiles* the only function of the army was that of frontier defence against tribal raids. These were kept in check by the legions concentrated at strategic points behind the actual fortified frontier (*limes*), which was manned by auxiliaries. Augustus greatly expanded and reorganised these troops. Auxiliary infantry, like the earlier *socii*, were formed into cohorts of infantry and *ala* of cavalry. While the praetorian and *vigiles* cohorts were 1000 strong, and the legionary cohorts 600, an auxiliary cohort might contain ten centuries each of 100 men, or only five centuries of the same size. *Ala* could likewise be either 500 or 1000 strong, but were divided into eight *veclla* of 120 each. There were also mixed cohorts of one *veclillum* of horse and four centuries of foot, and mixed *ala peditate* of one century and three *veclla*, or twice that number in the same proportion. Colonels of auxiliaries were sometimes called *praefectus* instead of tribunes. This rank had previously been held by the squadron-leader of legionary cavalry under the republic (*praefectus equitum*). There were also marines (*classici*) forming cohorts on the auxiliary model. The term *veclillatio* was not originally applied to a fighting unit, but meant either a draft of reinforcements or a working party responsible for a stretch of road or sector of fortification. But under the late empire barbarian mercenaries began to serve the empire under their own leaders, and both *veclillationes* and *cunei* were probably only a vague name for native war-bands and not part of the Rom. organisation at all. After the time of Diocletian such bodies came to preponderate in the army and the legion, whose infantry strength had been slightly reduced by the introduction of field engines (*tormenta*, *ballistae*), which were not served by a separate corps of artillery but by detachments drawn from within the legion and the cohort, was further reduced in strength, though the number of legions remained the same. See also under PRAETORIAN GUARD.

Roman Art, see ARCHITECTURE. *Rome*; POTTERY, *Rome*; see also under NUMISMATICS, PAINTING, and SCULPTURE.

Roman Britain, see BRITAIN, ANCIENT; ROMAN REMAINS.

Roman Catholic Church. *Institution and Object.*—The Church is defined by R. C. theologians as 'the union of all the faithful under one head'; this includes the Church Triumphant of the Saints in heaven, the Church Suffering or the Souls in purgatory (q.v.), the Church Militant or the faithful on earth. The last is the usual meaning of the word, and as such is defined as 'the association of baptised Christians united by profession of the same faith and by participation of the same sacraments under the jurisdiction of the bishop of Rome as the representative of Christ.' R. Cs. maintain that this visible Church was personally and directly founded by Christ (Matt. xviii. 18-20, etc.) for the salvation of souls (John xx.

21); to which end He endowed it with the threefold right and duty of teaching (Luke x. 10), sanctifying (John xv. 16), and ruling (Matt. xviii. 17-18) in His name. As authorised teacher of revealed truth, the R. C. C. claims an infallibility (*q.v.*) vested in (1) the ordinary teaching body (bishops) scattered throughout the world, (2) general councils, (3) under certain conditions the pope alone. The R. C. C. exercises her sanctifying power by the administration of the sacraments and the offering of the eucharistic sacrifice (mass). She includes in her jurisdiction the rights of legislating, of judging and of inflicting censures on refractory members. She cannot, however, revoke any precept of natural or divine law.

Notes of the Church.—The so-called Nicene Creed proposes four characteristics or notes by which the Church of Christ may be known: she is one (John x. 16), holy (Eph. v. 25-28), catholic or universal (Acts i. 8), apostolic (Eph. ii. 20). R. Cs. hold that these notes are wholly and solely verified in the R. C. C. She is *one* by unity in faith, in liturgy (eucharistic sacrifice and the sacraments), and in submission to one head; uniformity of ritual is not required. She is *holy* in so far as her doctrine safeguards holiness; she offers the means of holiness to all in the sacraments, and is distinguished by the heroic sanctity of so many of her children (saints); she does not pretend all R. Cs. are holy (*cf.* Matt. xiii. 24-30). She claims to be *catholic* as being universally widespread in place and time, to be restricted to no class, age, or race, and to contain in her teaching the fullness of Christ's doctrine. Her assertion of apostolicity rests upon identity in principle of doctrine, liturgy, and ruling power with the primitive Church, and historic continuity in descent from the authority and jurisdiction of the Apostles.

Organisation.—In 1907 by the decree *Lamentabili* (Nos. 52-56), and parallel passages in an Encyclical letter *Pascendi dominici gregis*, Pius X. repudiated on behalf of the R. C. C. the modern theory that Church authority comes not from Christ, but from the common religious consciousness of the faithful. The R. C. system is as follows: Christ is the invisible head of the Church (Eph. v. 23). He is represented on earth by the bishop of Rome as successor to St. Peter, 'the Rock,' on whom Christ built His Church, giving him the keys of the kingdom of heaven (Matt. xvi. 18, 19) and making him shepherd of the whole flock (John xxi. 15-17). The bishop of Rome therefore enjoys a primacy of honour and jurisdiction over other oriental patriarchs who are in communion with Rome. The Vatican Council (1870) declared his authority to be everywhere *episcopal, ordinary, and immediate*. Nevertheless, it is ordinarily exercised through the patriarchs (*see* C. Butler, *The Vatican Council* (1930), vol. ii. chap. x.), metropolitans, and other bishops who rule local churches by 'ordinary' jurisdiction. Oriental (Uniate, *q.v.*) churches are

directly responsible to their patriarch, but Rome is always the final court of appeal. In the W., dioceses usually governed by bishops are grouped into provs. under archbishops called 'metropolitans'—though not all archbishops are metropolitans. These have little ordinary jurisdiction outside their own dioceses except the power to summon and preside over a provincial council. Some metropolitans are also cardinals (*q.v.*). The title primate is now practically obsolete. Missionary dists. are ruled by vicars-apostolic and prefects-apostolic as representatives of the pope. Many religious orders and congregations are exempt from the jurisdiction of their local bishop, but they are responsible to him for any par. work they may have been entrusted with. The administration of the sacraments, except baptism and matrimony, is exclusively in the hands of the clergy. The ordination of bishops, priests, and deacons is admittedly a sacrament, though R. C. theologians debate as to whether the distinction of these orders is due to the personal intervention of Christ or not. The subdiaconate and the four minor orders of acolytes, exorcists, readers, and doorkeepers are of eccles. origin; some writers nevertheless admit their sacramental character. Their reception is a necessary preliminary to the priesthood, but otherwise is of little practical importance nowadays. The R. C. C. claims thus to be a perfect society, containing within herself all the necessary means to achieve her own end, the salvation of souls; receiving her authority directly from God through Christ, and entirely independent of civil authority (the State) with which she co-operates on an equal footing in 'mixed' matters—i.e. things pertaining to both jurisdictions. At the same time, as her aim (the salvation of souls) is higher than that of the State (the physical well-being of citizens), she arrogates to herself the right to criticize and, if need be, to condemn, legislation sacrificing the former to the latter object. By the Lateran Treaty of 1929, the pope was recognised as sovereign of the Vatican City State, and quite independent of the It. State. Many countries are in diplomatic relations with the pope, papal representatives abroad being known as nuncios or legates.

Extra Ecclesiam nulla salus—'Without the Church, no salvation'—is a saying of St. Augustine (*q.v.*) officially adopted by Innocent III. in the profession of faith to be made by converted Waldensians (1208) and ever since held by all R. Cs. It has been badly misunderstood to imply reprobation of all who, however inexcusably, find themselves outside the R. C. C. Rightly explained, it excludes from salvation those who deliberately separate themselves by heresy or schism from the Church, or who remain separated after recognising the strength of her claims. R. C. theologians differ in their explanations of how those who through no fault of their own, are outside the Church, are saved. But there is no question as to whether they are saved; the point under

debate is their precise relationship to the Church.

See *The Codex Juris Canonici* (the R. C. C.'s official law book compiled from ant. sources and promulgated in 1917 by Benedict XV.; it applies to the W. half of the Church only); and H. J. D. Denzinger, *Euchiridion Symbolorum et Definitionum*, 1874. See also HISTORY: P. Hughes, *History of the Church* (3 vols., 2nd ed.), 1947-48. DOGMATIC TREATISES: C. Hart, *Students' Catholic Doctrine* (11th ed.), 1931; B. Faa, *Catholic Belief*, 1936. INDIVIDUAL DOCTRINES: *Treasury of the Faith Series* (Burns, Oates, and Washbourne), 1925-30, revised and repub. in 2 vols. as *The Teaching of the Catholic Church*, 1945, and the Calvert Series of the same publishers; K. Adam, *The Spirit of Catholicism* (trans. 1929); F. J. Sheed, *Theology and Sanity*, 1947; and A. D. Howell Smith, *Thou Art Peter*, 1950. CONTROVERSIAL: O. R. Vassall-Phillips, *Catholic Christianity*, 1916, and A. Lunn, *Now I See*, 1933.

Roman Catholic Emancipation, see CATHOLIC EMANCIPATION.

Romance, originally designated a tale written in *roman*, or eleventh- or twelfth-century Fr., instead of in Lat. Its exact nature is not easily defined. In contradistinction to the seriousness and solidity of epic it may be said to possess the qualities of fantasy and mystery. But as all epic is not serious, so all R. is not fantastic, and the romantic fiction of the chivalric period shades into epic on the one hand and into the purely fantastic on the other. The origin of R. is to be found, probably, in the traditional tales and literature of the Celts of Wales and Brittany, whose characters it metamorphosed into medieval Frenchmen, but whose peculiar beauty it did not capture. R. had also a direct forerunner in France itself. This was the *chanson de geste* (q.v.), of which a fine example is the *Matière de France*, or saga of Charlemagne, which was nearer to the epic in its tone of lofty heroism and its spirit of seriousness. Yet, strangely, it was more romantic than R. itself, in that it possessed more of the fantastic, and that its spirit of wonder is much more genuine. In the R., on the other hand, this is employed in a merely theatrical manner. Both types, however, were of the same genre. The *dramatis personæ* of both were similar, the geographical scene of both was alike, and the fundamental plots were the same. Only the spirit is different. The romantic school had discovered the uses of a love-interest in fiction. This is used to supreme advantage. In the R. the relation of the sexes is changed. This art of love may be traced to Ovid and the later Lat. poets. Imbued by a literary *colerie* who communicated it to society at large by the means of lyric verse, assisted by poetic contests and 'courts of love,' this spirit soon found its way into the R. or fiction of the day. By the twelfth century this *art d'amour* had taken vigorous hold of the Gallic mind. It is by the 'discovery' of love that R. constituted something quite different from its predecessors in

fiction. It attained also a sophistication not seen in W. European literature since the Rom. Empire. But the Fr. romancers were in reality a highly unromantic body of writers, their love of the strange being merely an interest in novelty. As a result, the R., especially in France, has a cloying artificiality and frequently fails to convince. These faults are not found in the *chansons de gestes*, which are often extremely moving. In form, and in delicacy and beauty of language, however, the R. is supreme. The Eng. versions, too, possess some spiritual feeling and pathos which is lacking in most Fr. R., and Monmouth's Arthurian legends have some of the emotion and drama of the Song of Roland.

The matter of the R. was to a large extent Arthurian. There are sev. theories as to how the myth of Arthur (q.v.) grew into prominence, but in the twelfth century his story began to awaken general interest, which soon developed into a passionate admiration. For some time the tale was hawked about the country by jongleurs and minstrels, until at length it was seized upon by Geoffrey of Monmouth, who placed upon it the stamp of chivalric R. From England and France the tale penetrated to Germany and Italy, and for at least a century and a half remained the staple fictional matter of Europe, though the stories were much elaborated and distorted from the original. Geoffrey was followed by Wace, Marie de France (1150-65), Béroul (c. 1150), Thomas (c. 1130), Chretien de Troyes (d. 1182), and Guyot. Later the Grail legend became annexed to the Arthurian pure and simple, and the whole was welded into matchless symmetry by Sir Thomas Malory in the *Morte d'Arthur*. See also under NOVELS; ARTHUR; CHANSONS DE GESTES; TROUBADOUR.

Romance Languages, a main branch of languages (see under LINGUISTIC FAMILIES), originated, or rather estab., between the ninth and twelfth centuries from vulgar Lat., or else from Lat. *colore*, which was spoken in the Rom. Empire during the last centuries of its existence. The variety between the main R. L. — It., Fr., Provençal, Sp., Portuguese etc. — is due to the variation of the native non-Rom. dialects and the differences in the vulgar Lat. as it was spoken in Italy, Spain, Gaul etc. The classification of the R. L. is uncertain; this difficulty has already been emphasised by H. Schuchardt (*Ueber die Klassifikation der romanischen Mundarten*). According to F. C. Diez (1794-1876), the founder of this field of studies (1836), there are six R. L.: It., Walachian (= Rumanian), Portuguese, Sp., Provençal (including Catalan), and Fr. His theory was based on the existence of literatures. The It. G. I. Ascoli added (1873) a group of dialects, termed Ladin, i.e. the Romansch (q.v.) dialects of Switzerland, the R. dialects of S. Tyrol and Friulan. The Ger. W. Meyer-Lübke distinguishes the following nine members of this branch, from E. to W.: (1) Rumanian, (2) Dalmatian, (3) Rheto-Romanic, (4) It., (5) Sardinian, (6) Provençal (including Cata-

lan), (7) Fr., (8) Sp., and (9) Portuguese. His criteria are not accepted by It. linguists, according to whom Dalmatian, Rhaeto-Romanic, and Sardinian cannot be considered as independent languages, but as minor units allied or co-ordinated with, if not subordinated to, It., exactly as Galician should be considered as connected with Portuguese, and Catalan as allied with Provencal. They therefore distinguish the R. L. into seven groups (having added a group termed Franco-Provencal). Other scholars choose a compromise (including Dalmatian and Sardinian in the It. group, but considering the Rhaeto-Romanic dialects as independent). This extremely important branch of languages competes with the Germanic branch (see *INDO-EUROPEAN LANGUAGE*) for first place in number of speakers and cultural and historical importance.

Romance of the Rose, see *ROSE*, ROMAN DE LA.

Roman de Rou, see *WACE*, ROBERT.

Roman-Dutch Law, compound system of law, of which the basic principles are those of the Law Natural (see *JURISPRUDENCE*), made up of Ger. customs modified by the principles of Rom. law, and developed by later Dutch customary law. The founder of the system of jurisprudence known as R.-D. L. was Hugo de Groot (Grotius), he being the first writer to systematise the confused mass of legal principles which obtained in his day, and it is upon Grotius's classic (*Introduction to the Jurisprudence of Holland*) that subsequent legislators and jurists have erected the whole modern fabric of R.-D. L. The study of R.-D. L. is necessary to enable a student for the S. African Bar to practise there. See J. W. Wessels, *History of the Roman-Dutch Law*, 1908; Hugo de Groot, *Introduction to Roman-Dutch Law*, Eng. trans. by R. W. Lee, 1926; A. F. v. Maasdrp, *The Institute of Cape Law*, (4th ed.), 1922-26.

Roman Empire, Holy, see *HOLY ROMAN EMPIRE*.

Romanes, George John (1848-94), Brit. biologist and psychologist, b. at Kingston, Canada. At Cambridge he became a friend of Charles Darwin, and extended Darwin's theories of evolution into the field of psychology. He became a member of the Royal Society in 1879. He founded the R. Lecture at Oxford in 1891, whereby an ann. lecture on a literary or scientific topic should be given by some eminent person. His works include *A Candid Examination of Theism* (1878); *Animal Intelligence* (1881); *Charles Darwin* (1882); *Mental Evolution in Animals* (1883); *Jelly-Fish, Star-Fish, and Sea-Urchins* (1885); *Mental Evolution in Man* (1888); and *Mind and Motion and Monism* (1896).

Romanesque Architecture, see under *ARCHITECTURE*.

Roman History. The Lat. (see *LATINI*) were a branch of the Indo-European peoples who came into Italy from across the Alps towards the end of the second millennium B.C. The numerous hill-top settlements of these folk gradually coalesced into larger city states, the

greatest of which was Rome. The dominant position of Rome was assured by its geographical situation within easy reach of the sea and the centre of the peninsula, by its command of the Tiber ford, and by its consequent control of an important salt route between the mouth of the riv. and the Apennines.

So far as written hist. goes the earliest period of Rome is shrouded in myth. It is probable that government by kings was adopted about the end of the seventh century B.C. Again, the kingly period is obscure. We can, however, say that some of the kings were Etruscans (*q.v.*); that they were advised by a senate representing the noblest patrician clans; and that the less privileged orders were divided into thirty *curiæ* and, for military purposes, into *centuriæ* upon a property basis. The whole people, patricians (*q.v.*) and plebeians (*q.v.*), were included in a number of tribes which eventually increased to thirty-five in the third century. Under the Etruscan kings Rome advanced in civilisation, in commercial prosperity, and in geographical extent. It should, however, be noted that the Etruscan civilisation was essentially oriental and urban in character, but that despite its influence Rome remained essentially Lat. and agric.

At the end of the sixth century the last king, Tarquinius Superbus, was expelled, the monarchy abolished, and an aristocratic republican constitution set up. Two annually elected magistrates called consuls (*q.v.*) were appointed, though in an emergency these might be superseded by a dictator (*q.v.*).

THE REPUBLIC: (a) c. 509-265 B.C.—This period is best considered under two headings, the struggle between the orders, and the struggle for power in Italy. From the beginning of the republic the plebeians had grievances. The wealthier members of their order desired political and social equality with the patricians. They were incapable of holding public office and of contracting marriage (*connubium*) with the patricians. The poorer demanded more land, amelioration of the severe laws of debt, and a measure of personal security against the power of the magistrates. The prin. weapon in the struggle for these rights was the *secessio*, whereby the plebeians in a body left the city and set up, as it were, a state within the state.

After the first secession to the Mons Sacer the plebeians secured the appointment of their own officers, tribunes (*q.v.*) and aediles (*q.v.*). The former enjoyed personal inviolability and a power of veto. The latter had charge of the temples and public places. In 471 the *Lex Publilia Voleronis* made the plebeian assembly lawful and empowered the tribunes to propose and carry measures therein. These enactments (*plebiscita*) were binding only on the plebeians. The effect of the promulgation of the code of laws known as the Twelve Tables (*q.v.*) (451-450) was to limit the power of the patrician magistrates. In 449 the Valerio-Horatian Laws enacted that the determinations of the

plebeian assembly should be binding on the whole people, subject to ratification by the senate. Four years later the plebeians gained the right of *connubium* by the *Lex Canuleia*, and in 421 the quaestorship. This social legislation was interrupted by war, but in 387 the 'Licinian Rogations' enacted that one consul must be a plebeian, and ten years later a plebeian Caius Marcus Rutillius, held the office of dictator. The censorship (see CENSORS) and praetorship (see PRÆTOR) were occupied by plebeians in 350 and 337 respectively, and in 300 the *Lex Ogulnia* opened to them

were linked in a union known as the Lat League, and with this league Rome now negotiated an alliance in face of the threat. The Æqui and Volsci were the first to attack. In the first half of the fifth century the Romans and Latins with the independent tribe of the Hornci conducted a successful defensive. In the second half they went over to the offensive and to final victory. In 406 the expanding Roman influence resulted in a clash with Etruria. This campaign was concluded in 396 with the capture of Veii, and the whole of Etruria was annexed.

Much of the Roman success in this area was due to the preoccupation of the Etruscans with the Gauls who were invading from the Alps. In 390 these savage tribes entered Roman territory, defeated the Roman Army on the banks of the Allia, sacked the city, but withdrew after a fruitless siege of the Capitol. The Romans never forgot this disaster (*diem illiensem*) which was a severe blow to their prestige. Once more it was necessary to put down risings of neighbouring tribes and once more the Roman army triumphed and extended their boundaries. The Lat League was reorganised (358) on terms somewhat less favourable to the Latins. These attempted to regain their independence (340-338) but were crushed. The league was finally dissolved, and each member obliged to enter into treaties directly with Rome.

Roman interests became paramount in Campania following the alliance with Neapolis (326) and three campaigns resulted against the Samnites. Despite the humiliation of the Caudine Forks (321) in 321 the Romans inflicted a crushing defeat upon their enemies at Sentinum (295) and five years later the Samnite coalition was finally destroyed.

Meanwhile the Greek settlements of the South viewed with increasing apprehension the advance of Roman arms. The *casus belli* fell in 281 when the Tarentines, without provocation, attacked a squadron of Roman warships which had entered their waters and insulted the Roman ambasador who demanded satisfaction. Tarentum summoned to its aid King Pyrrhus (319) of Epirus. He landed in Italy (280) but after two 'Pyrrhic' victories at Heraclea and Asculum was decisively beaten at Beneventum (276).

Rome had now conquered the whole of Italy except Cisalpine Gaul. Her triumph had been achieved not only by force of arms, but also by her policy of colonisation and the building of roads. Much of the peninsula now enjoyed Roman citizenship and those who did not were bound to Rome by alliances of various grades. While direct taxation fell exclusively upon citizens all citizens and allies were bound to do military service. Most important, a common culture superseded local languages, cults and customs.

(b) 264-146 B.C. *The Punic Wars*—This period of one hundred and twenty years marks the second great crisis of the West, for the Carthaginian civilisation which now confronted Rome was no less essentially Asiatic than was the Persian



W. I. Marshall

A ROMAN TRIUMPH

A successful general returning, to Rome after a campaign, publicly honoured by a triumph

the exclusive college of pontiffs (q.v.) and augurs (q.v.). Finally in 287 the *Lex Hortensia* enlarged the provisions of the Valerio Horatian laws by exempting the plebeian decrees from senatorial ratification. The sovereignty of the people was now established, and if the newly won political privileges were accessible only to a small clique of rich men the less fortunate benefited by the distribution of land as the conquest of Italy proceeded and by such measures as the *Lex Poetelia de Nervis* which abolished imprisonment for debt. We have now to consider the stages whereby Rome became mistress of the peninsula. After the abolition of the monarchy Rome found herself between the sea and a wide semicircle of hostile peoples, the Etruscans, Samnites, Æqui, and Volsci. The other cities of Latium

which confronted Greece in the first crisis and those which have since periodically imperilled W. culture. There had long been rivalry between the two great commercial centres of S. Greece and Carthage (*q.v.*), and the representation of the Gk. cities had now passed to Rome. The occasion of the clash was the decision of Rome (264) to aid the Mamertines against Hiero II. (*q.v.*) of Syracuse. Carthaginian influence in Sicily was strong; consequently the decision was regarded as an act of war. In this, the first Punic war, Rome, despite the loss of three fleets, won some remarkable successes by sea, especially the battle of Mylae (260). When the war ended in 242 Carthage agreed to pay an indemnity, and evacuated Sicily whereby Rome acquired her first overseas possession.

It was clear to both sides that the contest would sooner or later be renewed. The two powers could not share the Mediterranean world. The years between the first and second Punic wars saw the Rom. occupation of Sardinia and Corsica; the Illyrian wars (229-219), which resulted in the suppression of piracy on the Dalmatian coast and Rom. alliances with Apollonia, Epidaurium, and the island of Coreyra (Corfu); and preparation for the impending struggle with Carthage. At Carthage the influence of the brilliant family of the Barcas was hampered by a jealous aristocracy, and Hamilcar Barca (*q.v.*) estab. a military state in Spain where Carthage already had commercial dependencies. He and his son-in-law, Hasdrubal (*q.v.*), consolidated the whole of E. Spain; and when Hasdrubal was assassinated (221) his place was taken by Hamilcar's son, Hannibal (*q.v.*), who immediately began to extend his authority northwards. In 218 Hannibal took Saguntum, a city in alliance with Rome. This was the signal for war, and Hannibal crossed the Alps into Italy. Owing to the military genius of Hannibal and the lack of generalship among the Romans, the Carthaginian Army delivered a series of crushing blows, culminating in the disaster of Cannae (216). The Romans, however, with amazing tenacity and the skill of new commanders, notably Quintus Fabius Maximus (see under *FABIA GENA*) and the younger Scipio (*q.v.*), gradually resumed the offensive. Hannibal meanwhile lacked the support of his gov.; Capua fell in 212, and in 207 the Carthaginians under Hannibal's brother, Hasdrubal, were completely routed at the Metaurus. Hannibal was recalled to Africa in 203, and in the following year suffered a total defeat at the hands of the younger Scipio (*q.v.*) at Zama. Carthage signed a treaty of peace in 201 which gave Rome Spain and the Mediterranean Is., left Carthage with only twenty war-ships, and the obligation to pay a war tax for fifty years, and virtually gave the Romans a decisive voice in the affairs of Carthage, both at home and overseas.

The next fifty years proved that these humiliating conditions had not destroyed the commercial genius of Carthage, and Rome, led by M. Porcius Cato (*q.v.*), deter-

mined that Carthage must be destroyed ('*Carthaginem esse delendam*'). The occasion was given in 153. The Numidian king Massinissa (*q.v.*), an ally of Rome, appropriated the rich district of Emporiae, part of the Carthaginian ter. The Carthaginian Gov. attempted to regain it by force of arms contrary to the treaty of 201, and despite their efforts to avoid war with Rome a Rom. army landed in Africa (149) under the command of Scipio Aemilianus (*q.v.*), forced Carthage to surrender, and razed the city. The dist. of Carthage became the Rom. prov. of Africa (146) with Utica as its cap. Two important results followed from the Punic wars. Rome was now mistress of the whole W. Mediterranean area and W. culture was saved. It was the Rom. destiny to spread that culture through the medium of universal dominion. Economically, Rome henceforward relied upon imports of corn and the native agriculture began to decline. The wealth of Rome was vastly increased, and this imperial aggrandisement with its accompanying seeds of degeneration was hastened from another quarter.

(c) 200-133: *Rome and the East*.—The Romans had already come under the influence of Gk. culture in the cities of S. Italy. Since the death of Alexander the Great (*q.v.*) the Gk. mainland had fallen into a state of virtual anarchy. During the second Punic war, Philip V. (*q.v.*) of Macedon had allied himself with Hannibal, and Rome, after Zama, had punished his delinquency at the battle of Cynoscephalae (197). Philip, however, was granted peace on generous terms and the freedom of the Gk. cities was reaffirmed (194).

Antiochus III. (*q.v.*) of Syria was another of those who had leagued himself with Hannibal; the Romans now turned upon him and defeated him at Thermopylae (191) and Myonesus (190). Antiochus forfeited his possessions in Europe and Asia Minor, and these were divided by Rome among friendly monarchs until such time as she chose to absorb them.

War against Macedon was renewed in 171. It ended with the Rom. victory at Pydna (168). The Macedonian king Perseus was captured with all his treasure and a republic was estab. In 147 the Achaean League (*q.v.*) attempted to regain Gk. independence. The league was finally defeated in 146 when Lucius Mummius sacked Corinth and transported its immense wealth and priceless works of art to Rome. Two more Rom. provs. were set up, Macedonia and Achaia, and a Rom. protectorate was recognised in Asia.

(d) 146-49: *The Revolution*.—In little more than a hundred years Rome had advanced from the status of a powerful city state to that of a world power, and the machinery of government which had hitherto served her had become totally inadequate. Moreover, the increase of wealth, with its accompanying moral decay and the decline of agriculture, had resulted in near chaos. Those who sought to remedy this state of affairs believed that

the foundation of recovery was agrarian reform, and a lead was given by Tiberius Gracchus (q.v.). He was elected tribune in 133, but the measures which he proposed evoked such violent opposition from the senate and capitalists that he was assassinated. Nor did his brother Caius Gracchus (q.v.) meet with much more success, suffering a like fate in 121.

The struggle for power now shifted to the military sphere. Caius Marius (q.v.) had reformed the army, successfully concluded (106) a war against the Numidian king Jugurtha (q.v.), repelled a barbarian irruption, and, together with his colleague Sulla (q.v.), suppressed the rebellion of the Itals known as the Social war. The mutual jealousy of Marius and Sulla ripened into civil war. In 83 Sulla, having defeated Mithridates the Great (q.v.) in Asia, marched on Rome, and by the victory of the Colline Gate made himself master of Italy. He posed as the champion of senatorial gov., was appointed dictator for an unlimited period, and after a reign of terror known as the Sullan proscriptions, set up a new constitution which aimed at making the senate supreme. Sulla retired into private life, and immediately the democratic party sprang to life. After an abortive attempt by Marcus Æmilius Lepidus (q.v.) to restore the constitution, a civil war in Spain (see SERTORIUS), and the slave revolt of Spartacus (q.v.), order was for a time restored. The prin. agent of the senate in suppressing these revolts was Cnaeus Pompeius (q.v.) (Pompey the Great). He now (70), with his colleague in the consulship, Marcus Licinius Crassus (q.v.), leagued himself with the democratic party, restored the pre-Sullan constitution, and reorganised the administration of the provincial taxes.

Pompey was next called upon to settle affairs in the E. By the *Lex Gabinia* he was given a three years' command with extraordinary powers against the Mediterranean pirates, and fulfilled his mission within three months. He was next entrusted by the *Lex Manilia* with the continuance of the second Mithridatic war which, with varying fortune, had been in progress since 74. Having repelled the immediate danger to the Rom. provinces in Asia Minor, Pompey ordered certain pressing E. affairs, notably the boundary dispute between Parthia and Armenia. Syria was made a prov., as were Asia, Bithynia, Pontus, Cilicia, and Crete. During the five years (67-62) of Pompey's sojourn in the E. Rome was again in confusion. The conspiracy of Lucius Sergius Catilina (see CATILINE) had been broken by the vigilance of Marcus Tullius Cicero (q.v.) as consul; but the senate refused to ratify Pompey's E. settlement, and it quarrelled also with the Equites (q.v.). At this juncture there returned from military triumphs in Further Spain, Caius Julius Caesar (q.v.). With him and Crassus Pompey formed the first triumvirate, and in 59 Caesar was elected consul. In this capacity he forced the ratification which the senate had withheld and carried other reforms calculated to restrict the

senatorial power. If these measures were not entirely popular Caesar yet laid the foundations of a strong central gov., maintained order, and extended the privileges of the provincials. It was already clear to him that if gov. was to be successfully carried on it must be in the hands of one man, and that his own were the most capable to guide the state. He obtained from the senate an extraordinary military command for five years with power to raise levies and appoint his subordinates.

Caesar at once left for Gaul, from where, in the intervals of some brilliant campaigns, he made two expeditions to Britain (q.v.). One result of these successes was to rouse the apprehension of Pompey, who now tried to increase his own power. But he lacked support, and so in 56 the triumvirate was renewed. In 55 Pompey and Crassus were consuls, but after the defeat and death of Crassus at the hands of the Parthians at Carrhae (53) Pompey received dictatorial powers as *consul sine collega*, and the breach between him and Caesar rapidly widened. The climax was reached in 49 when Pompey successfully attempted to have Caesar declared a public enemy. The die was cast, and Caesar, who had been watching events from Ravenna, crossed the Rubicon with one legion, and civil war began.

(c) 49-31: *End of the Republic.*—At his approach the senate fled from Rome, which Caesar occupied. There followed a series of astonishing campaigns whereby Caesar made himself master of the whole Rom. world. Pompey's lieutenants, Lucius Afranius and Marcus Petreius, were routed at Ilerda in Spain, and Caesar crossed into Epirus (48) where he defeated Pompey at Pharsalus. Pompey fled to Egypt where he was assassinated; Caesar followed him there and estab. Cleopatra and her brother Ptolemy XIII. as joint rulers. He then hurried to Asia Minor where Pharnaces II. (q.v.) of Bosphorus had invaded Rom. terr., and defeated him at Zela (47), the occasion of his celebrated message to the senate, 'Veni, Vidi, Vici.' The following year he won Numidia at the battle of Thapsus against the Pompeian forces under Scipio, and in 45 gained his crowning victory in Spain at Munda.

In the intervals of these campaigns Caesar began to settle the affairs of Rome. He restored order in Italy, reorganised the finances at home and in the provs., and reformed the calendar. In all but name he was monarch; nor was he at pains to hide the fact, understanding that it was the only method by which the empire could be satisfactorily governed. The jealousy thus aroused in disappointed ambition issued in Caesar's murder (March 15, 44), and once again Rome was on the brink of civil war.

The leading conspirators in the murder, Marcus Junius Brutus (q.v.) and Cassius Longinus (see CASSIUS), in the face of popular hostility fled to the E. Marcus Antonius (q.v.), once Caesar's able though disloyal lieutenant, went to Cisalpine Gaul. Caesar's great-nephew and heir,

Gaius Julius Cæsar Octavianus (the future Augustus), posed as champion of the senate, won the support of Cicero, and rallied an army of Cæsar's veterans. Octavianus was sent to the relief of Mutina besieged by Antony, but in the following year he, Antony, and Marcus Æmilius Lepidus (*q.v.*) formed the second triumvirate. Savage proscriptions now began, and among the thousands who perished therein was Cicero (43). The triumvirs next met and defeated the republican forces under Brutus and

ferring of the title Augustus, however, made his pre-eminence clear to all, while the *imperium proconsulare* and *tribunicia potestas*, which he received for life made him absolute master of the state, civil and military, both at home and abroad. Order was restored at home, the provinces reorganised, and the frontiers extended to the Danube. If Augustus died (A.D. 14) an unhappy man through family misfortunes, he had given Rome fifty years of peace and good government, and had established an empire whose supremacy is still



W. I. Munsell

THE DEATH OF CÆSAR

Mark Antony's funeral oration is given by J. D. Court. Two of the conspirators, Gaius Cassius and Marcus Brutus, are seen on the left of the picture.

Cassius at Philippi (42). The situation hardened into a contest between Antony in the East and Octavianus in the West. It was resolved in 31 at Actium, one of the decisive battles of the world, and Octavianus emerged as sole ruler of the Roman world.

THE EMPIRE (*a*) *Augustus* (*q.v.*) *Marcus Aurelius* — It was the intention of Octavian while exercising supreme power, to preserve on the one hand a show of republican institutions and to restore, on the other the old Roman manners and religion which formerly inspired her arms. As giver of peace he had the support of all classes, and future ages looked back to his reign as to a Golden Age. Styling himself *princeps senatus* he restored, at least in name, the authority of the senate, the magistrates, and the popular assemblies. The con-

ditions of the empire were, however, from the beginning certain defects in the Roman Empire which were eventually to destroy it. Perhaps the most fundamental defect, and that which characterised all the empires of antiquity and many to-day, was a total ignorance of the nature of man and his destiny and a consequent blindness to his rights and duties. Hence the moral degradation of the empire, hence the savage autocracy of the less enlightened rulers as Caligula (37-41), Nero (54-68) and Domitian (81-96). More immediately evident were the economic weaknesses, chief of which was the impossibility to provide by a reasonable taxation for the defence of the enormous frontier line against the barbarian hordes who were already stirring at the gates. Again, the power of the emperors depended to an

increasing degree upon the armies, especially upon the praetorian guard which, from the time of Caligula, practically made and unmade emperors at its will. Among the more important events of this period we may mention the rise of Christianity; the beginnings of the Rom. civil service in the reign of Claudius I. (41-54) under the freedmen Pallas and Narcissus; the Jewish wars of Vespasian and Titus, which ended with the destruction of Jerusalem (70) and the beginnings of the *diaspora*; the brilliant 'Age of the Antonines' when the empire reached its zenith; and the ever increasing advance of the imperial dignity from principate towards autocracy. (See also: ANTONINUS PRUS; AUGUSTUS; CALIGULA; CLAUDIUS; DOMITIAN; GALBA; HADRIAN; MARCUS AURELIUS; NERO; NERVA; OTHO; TIBERIUS; TITUS; TRAJAN; VESPASIAN; VITELLIUS.)

(b) *Marcus Aurelius-Dioctletian*.—The Rom. Empire reached its greatest extent under Trajan. In the reign of Marcus Aurelius (161-80) the weakness of the frontiers first became apparent. The legions were largely composed of barbarian recruits, and they, lacking anything in the nature of patriotism, were as great a danger as their kinsmen without. A succession of soldier-emperors followed; they were placed on the throne by the sword, and by the sword most of them perished. Two of them, however, Claudius II., an Illyrian, and Aurelian, a Pannarian, managed to stem the tide of invasion and for a time to restore the lustre of the fading empire.

(c) *Dioctletian-Romulus Augustulus*.—Dioctletian succeeded in 284. He was an Illyrian by birth. He finally abandoned the last pretence of a diarchy of emperor and senate, even assuming the trappings of oriental despotism and the style of 'Dominus.' His reforms, however, both economic and political, were so far-reaching that a period of peace and prosperity ensued. In order more easily to repel the barbarians he associated himself with the title of Augustus Maximianus. He retained supreme command, but took as his special prov. Asia and Egypt while Maximian took Italy and Africa. Two subordinate sovereigns were also adopted with the title of Caesar, Galinus in Thrace and Illyria, and Constantius Chlorus in Gaul and Spain.

Immediately on Dioctletian's death (313) fierce quarrels broke out, and civil war raged for ten years until Constantine the Great emerged as sole emperor. Under him there occurred two events of vital importance in the hist. of the world. In 325 he summoned at Nicea the first of a long series of general councils of the Church, the effect of whose decrees in the political as well as the theological sphere has endured until our own time. In 334 Constantine proclaimed Christianity as the official religion of the Rom. state. The other cardinal measure was the div. of the empire into E. and W. by the foundation of a new capital at Byzantium (Constantinople), with a new senate and a new nobility. This E. empire was Gk. in culture and developed into the Byzantine

Empire which endured through many vicissitudes but unvarying splendour until 1453. Once again, on the death of Constantine (337) the rival Caesars fought for power while the barbarians swept across the frontiers of the W.

In 364 Valens was appointed W. emperor by his brother, Valentinian I., of the Byzantium. For a time he succeeded in holding the Goths at bay, until his defeat in 378. Byzantium itself was now threatened; but the emperor Theodosius, by astute diplomacy, managed to save his own dominions and the throne of his W. colleague Gratian. From the death of Theodosius (395) the remaining hist. of the W. empire is chaos. Wave upon wave followed of Goths, Huns, and Vandals. Honorius (384-423), with the aid of his general Stilicho (a Vandal, defeated the Goths; but after Stilicho's death Alaric, the Visigothic king, after ravaging Macedonia and Illyria, captured and sacked the city of Rome. Gaul and Italy were overrun by the Huns, while the Vandals conquered N. Africa. In 451 the Vandal Genseric again sacked Rome; and finally in 476 the little emperor, Romulus Augustulus, resigned his throne to Odoacer (*q.v.*), who signified to Zeno, the E. emperor, that there was no longer need for a div. of the empire. Zeno should rule a united empire whilst Odoacer governed as patrician of Italy.

With respect to the sources of Rom. hist. from the estab. of Rom. supremacy in the Mediterranean until the fall of the republic (133-29 B.C.) only thirty-five of the 142 books of Livy's *Ab urbe condita libri* (trans. W. M. Roberts, 1912) remain, though epitomes of all but books 126 and 127 have survived. Of the *Bibliotheca historica* of Diodorus fifteen out of forty books remain. Connected narratives are to be found in the eleven extant books of Appian's *Civil Wars*, Sallust's *Catiline* or *Bellum Catilinarium* and *Jugurtha* or *Bellum Jugurthinum* (both trans. A. W. Pollard, 1882), and the *Commentarii* and *Gallie Wars* (both trans. G. W. A. McDermott, Everyman's Library, 1915) of Caesar. Neither of these works of Caesar completed the hist. of the Gallie and civil wars; the hist. of the former was completed in an eighth book usually ascribed to Hirtius, a partisan of Caesar, and the hist. of the Alexandrine, African, and Sp. wars was written in three separate books which are also ascribed to Hirtius. From the year 68 B.C. onwards the hist. of Dion Cassius is completely preserved, books 36-54 embracing the hist. from the wars of Luculus and Pompey against Mithridates to the death of Agrippa (10 B.C.). His description of this age is well supplemented by the writings of Cicero. Reference should also be made to the biographies of Plutarch (trans. B. Perrin, Loeb ed., 1914-28). It is only for the first century of the imperial age (29 B.C.-A.D. 285) that the sources are abundant enough to enable us to gain a relatively clear idea of it. Of the two great works of Tacitus (the 'Annals,' trans. G. G. Ramsay, 1904-9; also in the Loeb ed., describing the period from Augustus to

Nero, and the 'Histories,' trans. G. G. Ramsay, 1913, which embrace events from 69 until the death of Domitian) important portions are lost; but despite his prejudice he is the most trustworthy witness of that great æra. (Of Rom. historians writing in Gk. an extant hist. of the Rom. Empire in eight books from the death of Marcus Aurelius to the year 238, by Herodianus (trans. J. H. Hart, 1749; also in Loeb ed.), is valuable despite its defects. For the last period of the hist. of the W. Empire from its reorganisation by Diocletian and Constantine to the fall of the W. throne (285-476) the sources are more abundant than for the period 29 B.C.-A.D. 285, but are of very unequal merit. Of connected narratives only two are of real importance: the eighteen extant books, in Lat., *Resum Gestarum Libri XXXI.*, on the hist. of the empire from 353 to the death of Valens (378), by Ammianus Marcellinus (trans. C. D. Yonge, 1862), last of the great Rom. historians, and the hist. in six books in Gk. by Zosimus, a Gk. pagan historian of the time of Theodosius II., who comments severely on the faults and crimes of the Christian emperors, whence his credibility has been assailed by sev. Christian writers. Most valuable not only for legal and constitutional but even for contemporary hist. is presented by the great collections of laws which were made under the emperors Theodosius II. and Justinian. For our knowledge of the reorganisation of the empire by Diocletian and Constantine, we owe much to the *Notitia dignitatum*, a contemporary official document of great historical interest.

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Romani, tn. of Egypt, 20 m. E. of the Suez Canal. Here, on Aug. 3, 1916, the Turks attacked a force of Anzacs defending the canal, but after an initial success, were repulsed on Aug. 8 and retreated with heavy losses.

Romania, name used by some historians for the Lat. kingdom founded at Constantinople in 1204 by Baldwin, count of Flanders, and other crusaders who captured Constantinople and made Baldwin king. The kingdom had a stormy existence and came to an end in 1261 when Michael Palæologus, the Byzantine emperor, recaptured Constantinople. See under BYZANTINE EMPIRE; BALDWIN I.

Romania, see RUMANIA.

Romani Language, see under INDO-EUROPEAN LANGUAGES; GYPSIES.

Romanino, Girolamo (1485-1566), It. painter, b. in Brescia. He painted chiefly in his native city, and was a fine colourist, with peculiar skill in the use of light and shade. Among his works are four frescoes in the cathedral of Cremona (1519-20); a 'Madonna' in the Doria Gallery at Rome; a 'Nativity' in the National Gallery in London, and one at Brescia.

Roman Law, law founded on the Twelve Tables (q.v.). It is on this basis that the body of the *corpus juris civilis* (q.v.) or later private law of Rome was developed. The Twelve Tables represent the private law of auct. Rome in its earliest period. Custom was its foundation; its elements were known only by tradition, but, later, jurists knew it as the *ius civile* or law peculiar to the Rom. State. The hist. of R. L. is that of the changes introduced into the *ius civile* and of the method adopted in its evolution. It was only in the later days of the empire that the *ius civile* began to be swept away; but for the student it is essential to recognise the elementary doctrines of the old *ius civile*. The chief of these peculiar principles are those which determine the position of a *paterfamilias* (see AGNATES), or father of a family; the succession to his estate; and the contracts and actions relating to the chief possessions of an agrie. proprietor. The most important addition to the system of R. L. was the conception of the *lex nature*—a conception borrowed from

the Stoics. By *lex naturæ* was meant the law by which the actions of man were to be guided as well as the law directing the universe, and out of it grew the *jus gentium* (q.r.), which, with the *jus naturæ*, were the two chief agents in modifying and extending the rigid and narrow system of the *jus civile*. In its final state R. L. is to be found in the *Institutes* of Justinian (q.r.), supplemented by *Novellæ*, and the *Digest* or *Pandects*. See also CIVIL LAW. See T. C. Sandars, *Institutes of Justinian*, 1859; H. S. Maine, *Ancient Law*, 1861; W. A. Hunter, *Introduction to Roman Law*, 1880; J. Muirhead, *Historical Introduction to Private Law of Rome*, 1886.

Roman Literature, see LATIN LANGUAGE AND LITERATURE.

Romano di Lombardia, tn. in the prov. and 14 m. E.S.E. of the tn. of Bergamo. Lombardy, Italy. Pop. 5700.

Romano, Giulio, see GIULIO ROMANO.

Romanov, House of, ruling house of Russia from 1613 to the revolution in 1917. Roman, a member of an old noble family, gave his name to the dynasty, and by marrying his daughter Anastasia to Ivan the Terrible, he allied his family with the ruling house of Russia. Anastasia's two brothers, Daniel and Nikita, were prominent in the state, and the latter was especially popular both for his democratic ideas and for the moderating influence which he exercised over the tsar. With the death of Ivan the Terrible, the R. family was scattered by Boris Godounov. Nikita's eldest son, Theodore, known as the monk Philarete, was separated from his wife by order of Boris and imprisoned in a monastery at Marlenburg by the king of Poland. At the end of the civil wars which followed the death of Boris Godounov, Michael, the son of Theodore, was elected tsar on Feb. 21, 1613, by a representative assembly especially summoned for that purpose. Michael was sixteen years of age at his accession, and he ruled jointly with his father, the Patriarch Philarete, until the latter's death in 1633. The rule of the R. dynasty, of which the most famous exponents were Peter the Great and Catherine II., is associated with the expansion of Russia to its natural limits and with the growth of autocracy. The latter served to keep the new empire together against the Swedes, the Poles, and the Turks. In later times, however, the autocracy was abused, and in the 1917 revolution the tsar Nicholas II. was deposed. This, followed by the assassination of the tsar, the tsarina, and the tsarevitch, ended the rule of the R. dynasty. See also under RUSSIA (HISTORY). See G. Botkin, *The Real Romanovs*, 1932.

Romanov, Panteleimon (1884-1936), Russian author, b. at Petrovsk. In his short stories and novels he dealt with the human problems common in the contemporary social system.

Roman Remains in Britain. It has often been pointed out that Britain was a prov. of the Rom. Empire for three centuries and a half. Of the occupation there are very extensive remains not only

of the dominating military system, but also of tns. and vills, shrines and tombs, and the coins, trinkets, pots, tools, and weapons of the Romans and the Romanised Britons. For the portable items museum study is necessary, and collections vary from the extensive ones of the Brit. Museum; Ashmolean Museum, Oxford; Tullie House, Carlisle; Colchester; Reading; Verulamium; and National Museum of Wales, Cardiff, down to the half-dozen pots and coins of a local library. In recent years there has been much organised research and exploration of Rom. Britain; the excavations on Hadrian's Wall (q.r.), of the tns. of Verulamium, Camulodunum, and Leicester, of the Saxon shore fort at Richborough, and the investigation of war-damaged areas in tns. of Rom. date, Dover, Canterbury, and Exeter, have yielded information of special importance.

The occupation was based on the road system, and the courses of the chief roads and of many minor roads are well known; many sectors are still visible, and aerial photography has assisted in discovery. In general they did not follow the line of earlier tracks, and they were sited to take full advantage of natural topography. The *Fosse Way* runs from Lincoln through Leicester to Exeter by Cirencester and Bath. *Walling Street*, starting at Richborough, connects Canterbury, London, St. Albans, Wroxeter, and Chester. London is linked to the north by *Ferne Street*. From Chichester, *Stane Street* run to London. The *Ickneld Way*, perhaps a prehistoric ridgeway in origin, traversed the Berkshire downs and the Chilterns. Sev. stretches of Rom. roads are preserved as anct. monuments.

There are extensive remains of Rom. forts and military works still in existence, the chief of which is Hadrian's wall (q.r.). At Chester, York, and Caerleon-on-Usk may be seen examples of legionary forts, while at Richborough, Reculver, Lympne, Devonsey, Porchester, Burgh Castle, Suffolk, and Bradwell, Essex, are forts of the Saxon shore designed for protection against raids of the Saxon pirates. The Antonine wall has forts such as Bar Hill and Balmuldy which have been scientifically excavated. At Dover is a Rom. lighthouse which assisted cross-Channel navigation.

The walls of London, the largest tn. in Rom. Britain, are still visible in part, and over many years careful observation has resulted in the elucidation of the hist. and structure of the Rom. tn. At Wroxeter, Silchester, Colchester, and St. Albans extensive excavation has taken place; tn. walls remain, but the Jewry wall at Leicester, part of the forum, and the five gateways at Lincoln and Colchester are among the best out-of-door relics of Rom. Britain. At Verulamium (St. Albans) is an open-air theatre, the only one of its kind as yet known in Britain. It was probably used as a cockpit and not for the presentation of drama, and is now carefully turfed and preserved after its excavation. There is an amphitheatre at Dorchester, Dorset, exceptionally well preserved. The tn. of Bath (*Aquæ Sulis*)

was a small but luxurious watering place, the prosperity of which depended on its medicinal hot springs. The Great Bath, the central feature of the bathing system, may still be seen and there is good evidence of a magnificent temple with a sculptural pediment which was probably dedicated to Sul Minerva, goddess of the springs.

The most popular of the architectural remains of Roman Britain are the villas of which more than 500 examples have been recorded. They are found particularly in the Medway valley in W. Sussex, Hampshire and the Isle of Wight in Somerset on the Cotswold Hills and in S. Wales

and the Severn, have been marked out on the ground in concrete. A small basilican building at Silchester, now covered in, appeared to be a Christian church. Romano-British cemeteries and tombs are often revealed in farming and by industrial operations, as with pottery kilns; the structure is usually destroyed and the contents removed to a museum. A few conical Roman burial mounds, e.g. the Bartlow Hills, Essex, and the Six Hills, Stevenage, Hertfordshire, are still prominent features of the landscape. See under COCHISETTA, LONDON; SILCHESTER, YORK; VI, UTAMUM. See the annuaries in the *Journal of Roman Studies*.



THE ROMAN BATH, BATH

The villas were country estates, self-contained and very often self-supporting in agriculture and industry, such as cloth-milling. The house of the proprietor was often furnished with mosaic pavements, painted plaster walls, baths, and glazed windows, and was centrally heated. A remarkably fine villa at Chedworth (Gloucester) was purchased by public subscription after its excavation and vested in the National Trust. There are others of special note at Bignor, Sussex, and Woodchester, Gloucester, while at Lullingstone Park, Kent, there was found in 1949 a villa with a large mosaic floor on which was a complete record of an incident in the first book of the *Aeneid*.

Many other remains have been filled in after excavation. Such are the small rectangular temples of S and E Britain, which are closely similar to buildings found in Germany and Gaul, and which were for the worship of Romano-Celtic gods; the lines of one at Earley Heath,

for current work in R. B. See R. G. Collingwood, *The Archaeology of Roman Britain*, 1930, new ed. in preparation. See also R. G. Collingwood and J. N. L. Myers, *Roman Britain and the English Settlements*, 1937, ed.

Roman Roads. See under ROADS, ROMAN REMAINS.

Romans. In the dept. of Drome, France, on the Isère, 11 m. N.E. of Valence. The abbey (ninth century) was founded by St. Bernard of Vienne and lost some of its valuable stained glass through air raid damage during the Second World War. Silks and wools, leather shoes, hats, oils, and absinthe are made. Pop. 15,200.

Romans, Epistle to the. It has been unanimously accepted as a genuine epistle of St. Paul. It forms indeed a part of the central group of that apostle's writings. This central group consists of 1 and 2 Corinthians, Galatians, Romans, here is an orderly exposition of the principles

of the Christian religion and salvation in Christ as opposed to Jewish legalism. It is the longest of the apostle's writings, and, possibly the greatest, containing an epitome of his whole doctrine. It was written from Corinth on the third missionary journey (c. A.D. 56), and the apostle apparently anticipates visiting Rome (Rom. xv. 24), where he has many friends (Rom. xvi.). It is clear that he holds this predominantly Gentile church in high esteem (Rom. i. 8). He hopes to make Rome the centre of fresh missionary labours in the W. (Rom. i. 15). The main theme of the epistle is the relationship between Jew and Gentile, and their common salvation through the death of Christ. There are three main parts: a doctrinal treatise on the universal need for salvation and the life according to faith (I.-xi.), an exposition of Christian morality (xii.-xv.), a more intimate and personal conclusion (xvi.-xvii.). It is admittedly the most difficult of St. Paul's writings, and this is due in part to rapid transitions and grammatically confused sentences, and in part to the technical language. See J. B. Lightfoot, *Notes on the Epistles of St. Paul*, 1895, 1904, and particularly P. M. J. Lagrange, *Épître aux Romains*, 1918.

Romansch (also **Romansh** or **Rumansh**; the native term is **Romaunsh**; the word is obviously connected with 'Roman') is the fourth, and most recent, national and official language of Switzerland (the other three being Ger., Fr., and It.). R. is mainly spoken in Grisons (Graubünden, Grigioni, R. Grishun), the largest of the Swiss cantons (occupying over one-sixth of the national ter.), but the most sparsely populated. Only in the Engadine valleys do the R. speakers form a majority (about two-thirds) of the inhab. R. is steadily losing ground and has done so since ancient times. In pre-Rom. times the pop. of the riv.-valleys of the It. Alps spoke Rhaetic dialects and employed the N.-Etruscan alphabet (see **ALPHABET**). R. can be divided into four main dialects: Surilvanian, Subsilvanian, Upper Engadine, and Lower Engadine. Apart from these vulgar dialects there is the literary language, which has become the aforementioned fourth national language of Switzerland.

The relationship of R. with other Romance languages (*q.v.*) and dialects is uncertain. According to the It. linguist G. I. Ascoli (1873), R. was the W. of the three sub-groups of a group of Romance dialects, which he called *Ladin*, from the Engadine term for the local language, *ladin* (Lat.); the central sub-group being constituted by the dialects spoken in the semi-Ladin basins of Noce and Avisio S. of Fassa, in Ampezzo and beyond Chiusa, in Upper Cordevole and Comelico (i.e. roughly in the It. prov. of Venezia Tridentina); and the E. group being formed by the dialect spoken in Friuli (It. prov. of Udine), by about 800,000 people. This group has been called *Rätoromanisch* by T. Gartner (1883) and is also termed in Eng. 'Rhaeto-Romance' languages. According to this theory, the

three sub-groups are remains of one main group of dialects, originally spoken in the S. Alps from the Toce to Rhaas and later reduced to three linguistic is. by the expansion of Ger. in the N. and of It. dialects (Lombardic and Venetian) in the S. Ascoli's compatriot C. Battisti denies this historical and linguistic connection between the three 'sub-groups,' and considers R. as an independent group of dialects of the Romance languages.

Romanshorn, vil. in the canton of Thurgau, Switzerland, on the S. side of Lake Constance, 11½ m. S.E. of Constance; there are fisheries. Altitude 1300 ft. Pop. 6200.

Romantic Movement, term applied to a general artistic upheaval which culminated about 1830-40. It was a reaction against the accepted formulae of so-called 'classical' art, and although it may be regarded as having originated in the field of Ger. literature in the later eighteenth century (*e.g.* Lessing and Schiller), it rapidly embraced the whole of European art. The relative aims of classical and romantic art were summed up by Heine as follows: 'Classical art had to express only the finite, and its forms could be identical with the artist's idea; romantic art had to represent, or rather to typify, the infinite and the spiritual, and had therefore to be expressed symbolically.' Classical art may be said to possess objective beauty, since universal types are presented, the artist being chiefly a technical medium of realisation. Romantic art, on the other hand, is subjectively beautiful, since individual impressions are presented, the artist being primarily a psychological medium of interpretation. The rules evolved from classical tradition were not suited to romantic ideals; the former aimed at symmetry of outline and perfection of form, whilst the latter aimed at the expression of individuality. The R. M. therefore discarded formal beauty in favour of emotional intensity. The leading figures in the R. M. were in Eng. literature: Scott, Shelley, Byron, Wordsworth; in Ger. literature, Goethe, Heine, Tieck, and Hoffmann; in Fr. literature, Hugo, de Musset, George Sand, and Sainte-Beuve; in painting, Delacroix and Delacroix; and in music, Berlioz, Weber, Chopin, Schumann, and Meyerbeer. In these sources nearly all the important developments in modern art originated. See C. E. Vaughan, *The Romantic Revolt*, 1907, and D. G. James, *The Romantic Comedy*, 1948.

Roman Type, in printing, the upright character usually used, as opposed to the sloping characters or italics. The term rom. in reference to numbers denotes capitals or small letters (IV, iv) as opposed to the arabic (4).

Romanu, see **ROMAN**.

Romany, see **GYPSIES**.

Romberg, Sigmund (b. 1887), Hungarian-Amer. composer, b. at Szegedin and educated at Budapest Univ. He has written a large number of musical comedies and operettas in the Viennese tradition. His greatest successes include *The Student Prince* (1924) and *The New Moon* (1927).

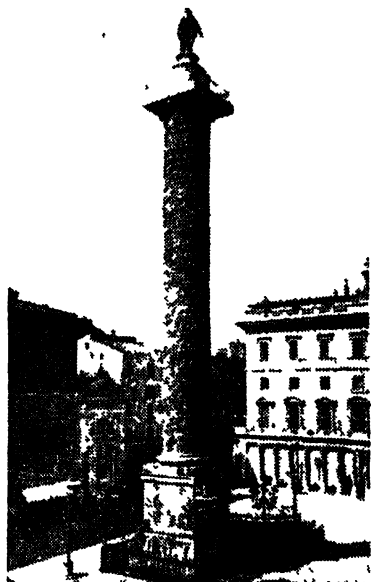
Rome, prov. of Italy in Latium. Its area is 3258 sq. m. Pop. 2,077,200. Chief tn., the city of Rome, cap. of Italy. Civita Vecchia is the port of R. The prin. lakes are the Lago di Bolsena, the Lago di Vico (the Cimbrin lake of anct. writers), and the Lago di Bracciano. The chief riv. is the Tiber, which rises in the Apennines, and flows down through the centre of R., entering the Tyrrhenian Sea. See under ITALY.

Rome: 1. City in Oneida co., New York, U.S.A., on the Mohawk R. and Erie Canal, 15 m. N.W. of Utica, in a dairy-farming and market-garden dist.; it manufs. brass and copper products, locomotives, and motor-cars. Pop. 34,000. 2. City and co. seat of Floyd co., Georgia, 50 m. N.W. of Atlanta; it has iron foundries, cotton and lumber mills. Pop. 26,300.

Rome-Berlin Axis, see AXIS, ROME-BERLIN.

Rome, City of, cap. of the Rom. Empire; until the Reformation, of W. Christendom; from 1871 until 1946 of the kingdom of Italy; since 1946 of the It. republic. It stands on the Tiber, 17 m. from its mouth, at the S. edge of the Etruscan hill country, overlooking the rolling plain known as the Campagna. The wall of Aurelian (A.D. 271-76), which is nearly complete, enclosed a pop. of about a million. Medieval R. contained from 15,000 to 40,000, the latter figure about A.D. 1500; the present pop. is 1,573,900. The city is unequally divided by the Tiber. The left (E.) and larger section includes the chief part both of the anct. and of the modern tn. On the r. b. is situated the papal R. of to-day (the Vatican and St. Peter's) and part of the city (Trastevere, etc.), belonging to the It. republic. The precincts of St. Peter's and the Vatican palace, with St. John Lateran on the l. b., belong to the sovereignty of the popes. The royal palace and chief public offices are upon, or adjoin, the Quirinal Hill. The Seven Hills, all on the E. side of the Tiber, are still recognisable. The Esquiline and Viminal are modern industrial quarters. The Palatine, with the Forum below it on the N., is covered with important anct. ruins. The Capitol, the most imposing of the hills, the centre of anct. life and worship, has, apart from the additional monument of Victor Emmanuel, suffered little change since the sixteenth century. The active business life of the city is centred in the lower ground between the hills, the Pincio quarter, and the riv. This lower portion, with the Borgo of St. Peter's and Trastevere, formed the medieval city. R. now contains few secular buildings of that age. The great sack of R. prepared the way for a great era of rebuilding and enlargement. Most of the great palaces and also of the churches were erected or remodelled in the seventeenth and eighteenth centuries. Between 1870 and the First World War the city underwent rapid and drastic reconstruction. New quarters on the N. and E. were built, and central R. adapted to its urgent modern needs. The Tiber was in a large part embanked upon the medieval model of the Arno at Florence.

Under Mussolini a number of alterations were made in R. Mussolini's aim was to revive R.'s anct. grandeur on the basis of the historical glories of the Caesars, thus linking imperial R. with the Fascist Empire. A new thoroughfare, the Via dell'Impero, was built from the Colosseum to the Piazza Venezia. This opened up a magnificent view of the relics of anct. R., though its construction involved the bisection of the Imperial Fora, and throughout archaeological claims were



ROME: THE ANTONINE COLUMN

A pillar in the Piazza Colonna, raised by the Senate in commemoration of the victories of Marcus Aurelius Antoninus over the Marcomanni and other German tribes

second to political considerations. Much was done to lay bare the remains of the Palatine and Forum, so that they might be permanently visible. A public park, the Passeggiata Archeologica, was formed from the area on both sides of the Appian Way, bounded by the city wall. The Fascist Gov. demolished many medieval and later buildings in order to excavate Rom. remains, and also built a number of blocks of modern flats, both within old R. itself and in the suburbs, which grow considerably between the two world wars.

Of the important older streets, the Via Lata (the Corso), the Via Giulia (1505-10), and the Via dei Banchi remain much as they were, and the densely peopled centre of R., between the Corso and the Tiber, is

of such solid and dignified construction that the work of the sixteenth and seventeenth centuries serves the needs of to-day. Of the great squares, the Piazza Navona, Campo dei Fiori, Piazza Venezia, and Piazza del Quirinale survive; the Venezia is much enlarged. The Piazza di Spagna and del Popolo are of more recent date. The great houses of the Cenci, Savelli, Orsini (Monte Giordano), Sforza-Cesarini, Massimo, the Cancelleria, date from the fifteenth century or earlier. The Quirinal (royal palace), Borghese, Colonna, Barberini, Rospigliosi, Odescalchi, Doria Panfilii, Farnese, Corsini are of middle or late Renaissance style. St. Peter's (q.v.) is the work of the sixteenth and seventeenth centuries. The Piazza is due to Bernini, who designed the colonnades which enclose it. The basilica of St. Peter's retains nothing above ground of the great medieval church which was destroyed to make room for the much larger church originally projected by Pope Nicolas V. (q.v.) and resumed by Julius II., who (1506) laid the foundation-stone of a building planned by the Bramante. Raphael and Michelangelo (after 1547) continued the work; the latter designed, and partly completed, the drum and dome which surmounts it. Paul V. added the façade and Bernini completed the Piazza. Systematic archaeological investigations under the site of St. Peter's (q.v.) in 1940 led to the discovery of a complete Rom. cemetery, with pagan and early Christian tombs dating from the middle of the second to the end of the third century A.D. It came as a surprise that no trace was found below St. Peter's either of the circus of Caligula and Nero or of the Via Cornelia, both of which are shown by all the topographers of ant. R. under the Vatican basilica. It would appear from the indications given by the Elder Pliny and Tacitus that the circus lay within the Vatican area and probably to the S. of the Old Grottoes or crypts of St. Peter's. The Vatican palace, which adjoins the basilica, contains parts of early medieval date; parts of the wall of the gardens are remains of the wall of Pope Leo IV. (A.D. 850). Nicolas V. added a new wing, as did Paul II. and Innocent VIII. Alexander VI. carried on the work of extension (1492), but the chief residential portion of the Vatican is the work of Sixtus V. (c. 1575). The Sistine Chapel (the prin. chapel of the palace) dates from Sixtus IV. (1480), and was decorated by Michelangelo and other great artists subsequently. The palace contains about 1000 apartments, including those set aside for museum, library, archives, and the like. St. John Lateran (q.v.) on the S.E. border of the city, before which is a noble piazza, claims to be 'the chief church of all that are in Christendom,' and has, historically, precedence of St. Peter's, was founded by Constantine the Great (A.D. 308-37); hence *Basilica Constantiniana*; it was rebuilt in 904-11, again in 1365-70, and remodelled in the style of the late Renaissance between 1560 and 1650. Here the popes were often crowned, and sev. councils were held.

The Lateran Palace was the papal residence from the time of Constantine until the migration to Avignon (1309). The present imposing building was erected by Sixtus V., whose reign was a great epoch of reconstruction in Rome. It now contains an important museum of classical and Christian sculpture. The same pope built the Quirinal palace as the summer house (1574) of the pontiffs. Three other churches, 'Patriarchal' churches, are of very ant. origin: St. Paul's, rebuilt 1823, on foundations of the original building of A.D. 386, San Lorenzo, S. Maria Maggiore. San Clemente and S. Pudenziana are older still. San Lorenzo was damaged during an air raid in July 1943, one bomb falling wide of the target, the marshalling yards of the main railway. Amongst other churches of great antiquity are S. Maria in Trastevere, Santi Quattro Coronati, S. Agnese, S. Maria in Cosmedin, S. Sabina, S. Saba, Ava Cella, and S. Maria sopra Minerva. Certain churches occupied original pagan buildings, as the Pantheon, S. Maria Antiqua, lately excavated on the edge of the Forum, SS. Lolina and Damiani. Many contain mosaics of the fourth and fifth centuries, and sculptured work of the classical age. Through these churches is maintained the continuity of ant. and modern R., for of secular building other than ruins little survives in continuous use if we except the theatre of Marcellus, mausoleums of Augustus, and of Hadrian, and parts of the Capitol. The Tiber is crossed by fourteen bridges, of which the Pons Fabricius is of the Republican age; and the central arches of the beautiful Ponte Sant' Angelo date from Hadrian. The new bridges within the city are for the most part worthy of their setting. Outside, to the N., the Ponte Milvio, which carries the great N. road, is mainly of republican work (109 B.C.). Of the ant. city gates, sev. are preserved and are still in use. Others have been reconstructed and transformed. The Porta del Popolo (1562, etc.), the historic entrance from the N. Porta Pia, in the E. wall, is that by which the It. troops forced their way into the city in 1870. The Porta S. Giovanni, by the Lateran, is the starting-point of the road to Naples; the Porta Tiburtina to Tivoli, Sulmona, and the central Adriatic coast. At the Porta Sebastiana begins the Via Appia to Brindisi, bordered by ant. tombs, and retaining long sections of the ant. paving. The three last cross the Campagna, which in imperial days was already partly deserted owing to malaria, the ravages of which have been much abated in modern times by drainage and the planting of eucalyptus-trees. This broad belt of desolate, uncultivated land, surrounding the city upon three sides, is the peculiar characteristic of the situation of R. The surviving monuments of ant. R. lie chiefly S. of a line drawn E. and W. across the Capitol. To the N. of this stands the main part of the modern city. From the railway station by the E. wall run the Via Nazionale and Corso Vittorio Emanuele. This is met at Piazza Venezia by the famous Corso (now Corso Umberto

I.) which leads in a straight line to the Porta del Popolo, the N. gate. The Tiber is bordered for most of its length by wide boulevards. The public gardens of R. are few. That of the Villa Borghese (now the garden of Villa Umberto I.), public property, is the St. James's Park of R., much frequented by children. It lies outside the walls, on the N., and is connected with the Pinio gardens, a famous promenade situated high above the city, at their inner angle. The Villa Borghese, built by Cardinal Borghese early in the seventeenth century, is a sumptuous museum of sculpture and of painting. The heights above Trastevere, on the W. bank of the Tiber, on the Janiculum hill, are laid out as a public park, where there is a great statue of Garibaldi. The chief museums are the vast papal collection (dating from the fifteenth century) of the Vatican, including auct. sculpture, Christian inscriptions, coins, Etruscan and Egyptian objects; the picture gallery, the wall-painting of Raphael ('Sistine') and 'Loggia', of Michelangelo, Pinturicchio (Borgia apartment), etc. The library is, though not very extensive, perhaps the richest in important MSS. The Lateran museum, the Capitol, the Thermæ, and many others are of special interest. Private galleries include the Barberini, Doria, Albani, Colonna. Other public collections of paintings are the Corsini and the Galleria d'Arte Moderna. The univ. (Sapienza), founded 1303, was at its height under Leo X. (1512-21), but is now of less importance. Various national seminaries for training Catholic clergy exist. The Fr. Academy of Art has its beautiful home in the Villa Medici; there are also Brit., Amor., and other schools of hist., archaeology, and art. But as an artists' centre R. has lost some of its importance since the end of the nineteenth century. The foundations of R. are remarkable. Certain sections of auct. aqueducts, bringing water from the Apennines beyond Tivoli and Palestrina, and from the Etruscan hills, are still in use. R. is one of the healthiest cities of Europe in spite of its trying summer climate. The public fountains of Trevi, Paola, Felce, and Marcia are monuments of distinction; but throughout the city water runs perpetually from hundreds of minor sources. R. has no large manufs. Its pop. is rapidly increasing, owing partly to its importance as the cap. and centre of government. The Senate and the Chamber of Deputies sit in R., and the public offices and the court involve a large residential element. The city government is in the hands of a Consiglio (city council) and Sindaco (lord mayor). The administration of health, public security, civic utilities, etc., is efficient and modern; transport within the city is highly organised, and there are tramway services from the falls of Tivoli (the Anio). The tns. on the Alban hills, 17-20 m. distant to the S.E., and Civita Castellana, to the N., 34 m., are connected with the system. There is air communication between R. and other world caps.

None of R.'s historical monuments

suffered serious damage during the Second World War; the damage done to St. Lorenzo was quickly repaired, and the Aurelian Wall had two breaches made in it. This damage occurred during the first Allied raid on R., the target being the railway marshalling yards, on July 19, 1943. On August 13 a heavy raid was made on military objectives near the city. Next day R. was declared an open city by the Badoglio Gov. In Sept. the gov. and royal family abandoned R. It was then garrisoned by Kesselring's troops. The real battle for R. began in May 1944, when fierce fighting took place in the Alban Hills. The Fifth U.S. Army entered the city on June 4 and R. became the seat of It. Gov. eleven days later (see further under ITALIAN FRONT, SECOND WORLD WAR CAMPAIGN ON). See also APPIA VIA, COLOSSEUM, FORUM, etc., for Rom. remains in R.; LATERAN CHURCH OF ST. JOHN, ST. PETER'S, VATICAN, etc., for Medieval and Renaissance R. also under ITALY, Roman History. See N. Young, *The Story of Rome*, 1901; E. Steinhmann, *Rom in der Renaissance*, 1908; E. Hutton, *Rome*, 1909; H. Stuart-Jones, *Classical Rome*, 1911; E. V. Lucas, *A Wanderer in Rome*, 1926; G. Lugli, *I Monumenti antichi di Roma e suburbio*, 1930-40; R. Elston, *Cook's Traveller's Handbook to Rome* (6th ed.), 1935; F. Male, *Rome et ses vieilles églises*, 1942; L. Curtis, *Das antike Rom*, 1944; and J. More, *The Land of Italy*, 1949.

Rome, King of, see NAPOLEON II.

Rome, Prix de, highest award given to the pupils of the Fr. Academy of Fine Arts. It gives access to the Académie de France à Rome. There are minute rules governing the award, which is much coveted.

Römer, Ole, or Olaf, or Olaus Christensen (1644-1710), Dan. astronomer and mathematician, b. at Aarhus, Denmark. He went to the univ. of Copenhagen in 1662, where he made a special study of mathematics and astronomy. After leaving the univ. he became assistant to Picard and Cassini at the Observatory of Paris, and soon afterwards was made tutor to the Dauphin and was given a pension by Louis XIV. in 1672. In September 1676 he announced to the members of the Paris Académie des Sciences that the eclipse of the inner satellite of Jupiter, which was expected on Nov. 9, 1677, would be ten minutes later than the time computed on the basis of the previous eclipses, and the following year the eclipse took place in accordance with his prediction, thus proving conclusively that the velocity of light was finite. In 1681 he returned to Denmark as prof. of mathematics at the univ. of Copenhagen and soon afterwards was appointed astronomer royal to Christian V., who quickly recognised his ability in other spheres. R. was appointed to a number of important posts: master of the mint, inspector of naval architecture, advisor on pyrotechnics and ballistics, etc., and in 1688 he was made a member of the Privy Council. Early in the next century he was made mayor of Copenhagen and prefect of the police, and also a senator and

head of the state council. See R. Horrebow, *Basis Astronomix*, 1735.

Rome Scholarships, Brit. academic awards in painting, sculpture, archaeology, hist., etc., made by the faculties of art in those subjects of the Brit. School at Rome, founded in 1913. A Brit. student awarded a Rome scholarship spends two years in Rome studying his subject.

Romescot, or **Rom-feoh**, see PETER'S PENCE.

Romford, mun. bor. and mrkt. tn. of Essex, England, 12 m. E.N.E. of London, on the Rom. It is noted for its market. There was a Rom. station called Duro-lum here. The parl. constituency of R. includes the urb. dist. of Brontwood. Pop. of bor. 73,000.

Romilly, Sir Samuel (1757-1818), Eng. lawyer and reformer, b. in London, and educated privately and at Gray's Inn. He was called to the Bar in 1783, and took silk seventeen years later. He entered Parliament in 1806 and in that year was solicitor-general in the short-lived second Grenville administration. He effected many legal reforms, helping to mitigate the severity of the criminal laws; it was R. who secured the abolition of the death penalty for many classes of petty crime. R. joined in the anti-slavery agitation, and opposed the suspension of the Habeas Corpus Act. His promising career was cut short by his suicide. He wrote *Observations on the Criminal Law of England, as it relates to Capital Punishment* (1818). See life by C. G. Oakes, 1935.

Romilly-sur-Seine, tn. in the dept. of Aube, France, 23 m. N.W. of Troyes; it has manufs. of hosiery and needles, and there are railway shops. Pop. 14,100.

Rommel, Erwin Johannes Eugen (1891-1944), Ger. soldier, b. at Heidenheim, near Ulm, Wurttemberg. He joined the army in 1910, and was commissioned in 1912. During the First World War R. served in France, Rumania, and Italy, was decorated with the Iron Cross, Class I., and the *Order pour le Merite*, and was promoted captain in 1917. After the war he was a company commander at Stuttgart until 1929, when he was appointed instructor at the War Academy, Dresden. Having been promoted lieutenant-colonel in 1935 he received a similar post at the War Academy at Potsdam. In Nov. 1938 R. was commandant of the War Academy at Wiener Neustadt. On the outbreak of the Second World War he held the rank of major-general, and was given command of the 7th Panzer Div. in Feb. 1940, and on June 12 R. received the surrender of Maj.-Gen. Fortune, four Fr. generals, and 19,000 allied troops at St. Valery-en-Caux in Normandy. He was awarded the Knights' Cross of the Iron Cross.

After the defeat of Graziani in Libya R. was appointed to command Ger. troops there, which at first consisted only of the 5th and 9th Light Divs. He was promoted lieutenant-general in Jan. 1941. (For R.'s campaigns in Libya and Egypt see under SECOND WORLD WAR.) For his advance in the summer of 1942 from Gazala to Alamein, R. was promoted

field marshal, decorated, and praised by the Ger. press. But he was not adequately supplied with ammunition and reserve tanks; on June 31 he had only twelve Ger. tanks in running order. Between then and the arrival of Montgomery (q.v.) on Aug. 15 he had to beat off six Brit. counter-attacks before he could again seek a decision at Alam Halfa on Aug. 31. During the four days of this battle he was ill, and on Sept. 24 was flown home to hospital, on the way seeing Hitler, to whom he appealed for more supplies and motorised troops. On Oct. 24, at the height of the Alamein battle, Stumme, his successor, died, and R. was flown from hospital to conduct the lost battle and the withdrawal to Tunisia. His request for more motorised troops had not been granted. The 164th Infantry Div. and the Ramcke Brigade of four paratroop battalions were his only reinforcements. From now until the end of the campaign R. was a sick man. In Nov. he again saw Hitler, who finally promised support. This, however, was not forthcoming. Ger. reinforcements were indeed poured into Tunisia, but R. did not get control of these until Feb. 22, 1943, when he became commander-in-chief Army Group Africa. At Kasserine Pass in that month he inflicted a heavy defeat on the Amer. 2nd Corps, but his counter-attack against the Eighth Army failed at Medenine on March 5. A week later R. flew to Germany, where (according to his family) he asked Hitler for permission to evacuate his troops, but this was refused, and he was accused of cowardice. He was in hospital for some weeks, and on May 12 again saw Hitler, who said to him: 'I should have listened to you earlier. Africa is lost now.'

After the allied victories in N. Africa R. was given command of troops in N. Italy. Despite his misgivings as to the North Sea and Atlantic defences in Jan. 1944 he accepted command of Ger. troops in Holland and of the Fifteenth and Seventh Armies in N. and N.W. France. (For the summer campaign of 1944 see WESTERN FRONT in the SECOND WORLD WAR.)

On July 17 R. was severely injured when his car was shot up by the R.A.F. He was suspected of complicity in the plot against Hitler (June 1944). When at home on convalescent leave he was offered the alternative of trial before a people's court or suicide by poison. He chose the latter, and died Oct. 14.

On the professional plane R. has been dismissed as a brilliant tactician but an indifferent organiser. If this were so he could never have succeeded in the desert, which as Gen. von Thoms, a later commander of the Afrika Korps, has said, was 'a tactician's paradise, but a quartermaster's nightmare.' His largest command in Africa was only a tactical one. Questions of supply were decided for him before the material left Europe, and R. suffered from the inefficiency of Cavallero and the enmity of Kesselsring (q.v.). See E. Rommel, *Infanterie Greift an*, 1937; A. Morehead, *African Trilogy*, 1946; M. Shulman, *Defeat in the West*, 1947; H. B. Giesvius, *To the Hitler End*, 1948;

U. von Hassel, *Diaries*, 1948; H. Speidel, *Invasion*, 1914, 1949; and D. Young, *Rommel*, 1950.

Romney, George (1734-1802), Eng. artist, b. at Dalton-in-Furness, the son of a cabinet-maker. He early showed a taste for drawing, and was apprenticed to Edward Steele, the portrait painter, who lived at Kendal. R. came to London in 1762, and painted many pictures, travelling abroad to study when he could afford to do so. His portraits became popular, and he became a professional rival of Sir Joshua Reynolds. Perhaps his most famous sitter was Lady Hamilton, of whom he painted many likenesses. In his later years he suffered from despondency and ill health. After his death his works were little sought, but this unnatural reaction passed, and to-day they are of considerable value. R. excelled in portraying vital, radiant Eng. beauties of the day; he could express character in the simplest of pictures, such as 'The Parson's Daughter,' and his treatment of skin-textures and materials was particularly fine. See lives by R. S. Gower, 1904; H. Ward and W. Roberts, 1904; and B. L. K. Henderson, 1922.

Romney Marsh, 13½ sq. mi. of rich sheep pasture, Kent, England, near Hythe, protected against the sea by a huge embankment and by a drainage system, under the management of an auct. corporation known as the Lords of R. M. Area 24,950 ac. There are sev. vils.

Romney Marsh Breed, see SHEEP.

Romney, New, municipal bor. and Cinque Port, Kent, England, 22 m. S.W. of Canterbury. It is now about a mile from the sea, its harbour having silted up in the thirteenth century. The par. of N. R. contains the watering-place of Littlestone-on-Sea. Pop. 2300. Old Romney is a par., 2 m. W. by N.

Romny, or Romen, tn. of the Ukrainian S.S.R., 110 m. N.W. of Poltava. It manufs. tobacco and flour. Pop. 30,000.

Romorantin, tn. in the dept. of Loir-et-Cher, France, 39 m. S.W. of Orléans. It has manufs. of cloth and oil refineries, and is noted for asparagus. It was once the cap. of Solomne. The edict issued from here in 1560 excluded the Inquisition from France. Pop. 7500.

Romsdal, valley in Norway, fylke of Møre, S.W. of Trondheim, extending from Mt. Snebbatten (7570 ft.) W. and N.W. to the Atlantic; is noted for its fine scenery, particularly in the valley of the Rauma and the peaks of Romsdalshorn (5095 ft.) and Trollinder (6010 ft.). Cap. Molde. Area 5787 sq. m.

Romsey, municipal bor. and mrkt. tn. of Hampshire, England, 8 m. N.W. of Southampton, on the Test. It has a brewery, jam manufs., and sev. other industries. The fine Norman church of St. Mary dates from the twelfth century, being originally the church of a Benedictine nunnery. Another notable building is King John's House (c. 1206). There is excellent fishing in the R. Test, and it is an excellent centre for the New Forest. Pop. 6500.

Romuald, Saint (c. 950-1027), It. saint

and monastic reformer, b. at Ravenna of the noble family of the Onesti. He became a Benedictine at Ravenna, and was abbot there between 996 and 999. In the latter year he resigned and led a wandering life in central and N. Italy, and the Pyrenees. He estab. hermitages and monasteries, the most famous of his foundations being the monastery of Camaldoli, near Arezzo (1009). This still exists, and from it developed the Camaldolese order (q.v.). R. attempted sev. times to go as a missionary among the Slavs. His feast day is June 19; Feb. 7 commemorates the translation of his relics from Val de Castro to Fabriano.

Romulan Calendar, div. of Rom. year, see under CALENDAR.

Romulus, name of the mythical founder of Rome, son of Mars and Rhea Sylvia, and twin brother of Remus. A well-known legend tells how they miraculously escaped drowning, and were reared by a she-wolf, finally receiving protection from the herdsman, Faustulus, and his wife. On reaching manhood, they planned and succeeded to expel the usurper, Amulius, and restore his brother and their grandfather Numitor to the throne of Alba. They then asked his permission to build a city on the Tiber's banks, but quarrelled as to its site and name. R., according to the usual story, killed Remus for laughing at his walls on the Palatine Hill. He then made the Capitol an asylum for refugees and adventurers, and provided wives for his citizens by the 'rape of the Sabines.' The resulting war ended in the joint rule of Tatius, king of the Sabini, and R. Later R. reigned alone, was carried up to heaven, and later worshipped as the god Quirinus by the Romans. While all scholars agree that the whole story is artificial it is not exact to say, as some do, that it is either of Gk. or Etruscan origin. Indeed, the birth exposure, the miraculous rescue, the heroic deeds of the twins, the asylum to adventurers, etc., are tales of familiar type in oriental, Gk., or Etruscan mythologies, but there is no indication whatever that the Gk. or Etruscan tales were of oriental origin or that the Rom. tale was of Gk. or Etruscan origin. They probably were indigenous stories. However, there is no doubt that the name R. derived from the place-name Rome (R. was the adjective of Rome, a parallel with Siculus, Rutulus, Equiculus; see *Romula gens* in Horace; at a later period only *Romanus* was used to indicate the Rom. people), and not Rome from R., as the legend refers. Quirinus was a god and another eponymus of *populus Romanus Quiritium*; his identification with R. was thus obvious. According to Rom. tradition, a *niger lupus* was considered as connected with the sepulchre of R. or Faustulus or Hostilius. This *lapis niger* was in 1899 discovered by G. Boni not far from the church of S. Hadrian, but it has been proved that the supposed tomb of R. was not a tomb at all.

Romulus Augustulus, see AUGUSTULUS, ROMULUS.

Ronald, Sir Landon (1873-1938), Eng.

conductor and composer; *b.* in London, a son of Henry Russell, composer of *Cheer! Boys, Cheer!* and other popular songs, and educated at St. Marylebone and All Souls Grammar School and at Margate. He received his musical training at the Royal College of Music, London, and R. assumed the surname of Ronald. He first appeared as a pianist in a wordless play, *L'Enfant prodige*, 1891. From that year he was accompanist at Covent Garden, and toured with Melba in America, 1894. From 1908 R. conducted the Albert Hall Orchestra, and he was principal of the Guildhall School of Music from 1910. R. was knighted in 1922. He composed incidental music, songs, ballet music, and orchestral works.

Ronaldshay, Earl of, see ZETLAND, MARQUESS OF.

Ronaldshay: 1. North, most northerly of the Orkney Is., Scotland, 2½ m. N.N.W. of Sanday, from which it is separated by the N. Ronaldshay Firth. Area 4 sq. m. Pop. 400. 2. South, most southerly of the Orkney Is., Scotland, 6 m. N.N.E. of Duncansby Head, containing the vil. of St. Margaret's Hope. The surface is level and well cultivated; it is connected to Mainland of Orkney by Churchill Barrier. Length 8 m. Area (including adjacent is.) 18 sq. m. Pop. 2000.

Roncesvalles (Fr. *Roncevaux*; Basque, *Orhial*), vil. of Spain in the Pyrenees, in the prov. of Navarre, 22 m. N.E. of Pamplona. The old church was erected in memory of Roland, a paladin of Charlemagne, who was overwhelmed by the Basques in 778 at the famous pass near by, and is a resort of numerous pilgrims. Pop. 150.

Ronda, tn. in the prov. of Málaga, Spain, 42 m. N. of Gibraltar, built on both sides of a deep gorge (530 ft. deep, 300 ft. wide) of the Guadiaro R., and there is trade in wine, leather goods, and horses. R. was, until 1485, cap. of a small Moorish kingdom, the old tn. being built by the Moors and the new by Catholic kings. Pop. 32,800.

Rondeau. A verse-form of Fr. origin. The word is a later form of *Rondel*; modern usage, following the practice of Beauville, has estab. an arbitrary distinction between the *rondel* (*q.v.*) and the *R.*, but this is not universally observed.

The term occurs in the thirteenth century when it is applied to the music or the words accompanying a dance or 'round'; Guillaume d'Amiens and Adam de la Halle use the form, but the structure of their poems is very varied both in metre and in the number of lines. Already, however, the lines fall into three groups, the whole of the first line coming as a refrain at the end of the second and third groups. In the fourteenth century the R. passed from the musical to the literary sphere. Various types are found in the works of Eustache Deschamps. Of these, two mainly survive, the form used by Charles d'Orléans in *Le temps a laissé son manteau* being described as a *rondel*. This has thirteen lines on two rhymes, grouped in three stanzas of four, four, and five lines (the first two lines recurring as the third and

fourth of the second stanza and the first line being repeated as a refrain at the end of the third stanza). The most usual rhyme scheme is ABba, abAB, abbaA, where capitals indicate the repeated lines.

During the fifteenth century, perhaps through misinterpretation of copyists' abbreviations, the refrain was reduced to the repetition, outside the rhyme scheme, of the first half of the first line. This second type was used by poets until the seventeenth century, when the form dropped out of use until its revival in the nineteenth century. The pattern, the second type now regarded as standard is that used by Voiture; it consists of thirteen lines, on two rhymes, grouped in three stanzas of five, three, and five lines with partial refrain after the eighth and last lines. The usual rhyme scheme is aabba, aablt, aabbaR, but later poets, e.g. de Musset, have varied this.

Rondebosch, residential suburb of Cape Town *q.v.*, S. Africa, 5 m. S. of the city. Here are Groote Schuur, the official residence of the Prime Minister, and the Cape Town Univ. on the mt. slopes above R.

Rondel: 1. Synonym of *rondeau* (*q.v.*). 2. In modern usage, restricted to the *rondeau* of thirteen lines as used by Charles d'Orléans. Some poets repeat the first and second lines at the end of the poem, thus making fourteen lines.

Rondo, or *Rondeau*, musical composition, most important musical form since the eighteenth century, next to sonata-form, and frequently forming part of a sonata-form work, especially as the finale. Its general principle is that of a return to an initial theme, as to a refrain, with different episodes between. The Fr. *rondau* of the eighteenth century was merely a matter of detached sections, the first of them recurring after each of the incidental ones, which were called *complets*. Later the episodes became linked to the prin. theme by transitions, and the highest development of the R. was, especially in Mozart's hands at first, the so-called sonata-R. form, where one of the episodes appeared at first in a key related to the tonic and returned as another episode in the tonic key, exactly like a second sonata subject. Like a sonata movement, a R. may have a coda; much more rarely one of the episodes may be in the nature of a thematic working-out. The recurrences of the theme are often saved from monotony by (e.g. Mozart) abbreviation or (e.g. Beethoven) variation.

Ronne, seaport of Denmark, cap. of Bornholm Is. (*q.v.*), situated on the W. coast of the is. The harbour has been deepened, and there are shipyards and kaolin pottery manufs. Pop. 10,000.

Ronsard, Pierre de (1524-85), Fr. poet, *b.* at the Château de la Poissonnière, Vendômois, son of Loys de R., *maître d'hôtel* to the Dauphin. R. left the Collège de Navarre to become page to the Dauphin, and accompanied James V. and Madeleine of France to Scotland, where he spent two years. He then lived at the Fr. court until, at eighteen, deafness dashed his hopes of preferment. R. found comfort in learning and studied

Gk. under Dorat. R. collaborated with du Bellay in writing *Défense et illustration de la langue française* (1549), which inaugurated a new literary age, that of classicism, and then began to publish poetry of the kind advocated in the manifesto. Until the death of his benefactor, Charles IX., in 1574, R. lived at court and at his home in Touraine, much patronised and famous. He spent his last years in quiet retirement in Touraine. Few poets have achieved such glory during their lifetime as R. Kings and queens treated him as their equal; Mary of Scotland, Elizabeth of England, and Charles IX. lionised him with admiration and honours. R.'s poetic work falls into four periods: 1550-54 (Pindaric odes); 1554-60 (Anacreontic inspiration); 1560-74 (court poems); 1574-84 (*Sonnets pour Hélène*); of these periods the second and fourth are the finest. His greatness as a lyric poet lies in his evident sincerity, his feeling for the fragility of human life and beauty, his fondness for natural beauty; he has been called 'the poet of the roses.' His chief faults are his tendency to diffuseness, and undue imitation of the classical poets and Petrarch, but his poetry has variety, force, and a rich, delicate beauty.

Joachim du Bellay (1525-60). R.'s collaborator in *La Défense et illustration de la langue française*, was b. at Liré, near Angers, deafness barring him from the worldly success to which, as a member of a distinguished family of prelates and diplomats, he might otherwise have aspired. His short, uneventful life was that of a scholar, brightened from 1547 by his friendship with R., and saddened by absence from his Angevin home, as when he lived in Rome (1551-54) with his relative, the Cardinal du Bellay. Among his finest work is *Les Regrets* (1559), a collection of poems satirising the modern Romes, and thinking wistfully of home. His poems reveal without reserve a melancholy mind which muses on the flight of time and the passing of human greatness. Du Bellay is the master of the sonnet. He shows the same faults as R., but is perhaps a more sincere poet, and might, had he lived longer, have surpassed his friend.

R. and du Bellay stirred to action the latent desire to rival in Fr. the achievement of Gk. Rom., and It. poetry. Great thoughts, they maintained, must be expressed not in Lat. but in Fr. The mother tongue must be defended against Lat. but rendered a worthy vehicle of expression, made illustrious by reforms in poetic diction. The way to reach that end they showed by precept, in the *Défense*, and by example in their poems. R. and du Bellay treated the great lyric themes nobly. See also FRENCH LANGUAGE AND LITERATURE. See life of Ronsard by D. B. Wyndham Lewis, 1916; also G. Wyndham, *Ronsard and the Pléiade*, 1906; M. Raymond, *L'influence de Ronsard sur la poésie française*, 1927; J. Vianey, *Les Odes de Ronsard*, 1932; and Gladys Turquet's trans. of the *Défense*, 1930.

Ronsdorf, tn. of Germany, in the Rhineland (formerly Rhenish Prussia), 3 m.

S.E. of Elberfeld, with iron, steel, and copper works, and manufs. of silk ribbons. Pop. 14,000.

Ronse, Fr. *Renaix*, city in E. Flanders, 23 m. S.S.W. of Ghent. It manufs. cotton and woollen goods, silk, thread, hats, and shoes. The church of St. Hermes dates from the eleventh century and its crypt is one of the most interesting in the country. Pop. 25,900.

Röntgen, Wilhelm Konrad von (1845-1923), Ger. physicist and inventor, b. at Lennep. He studied at Zürich Univ. and elsewhere, and held chairs successively at the univs. of Hohenheim, Strassburg, Gießen, and Würzburg. In 1895 he discovered the famous R. or X-rays, with which his name will always be associated. This discovery revolutionised physics and modern surgery. He became prof. of experimental physics at Munich in 1899. He received the Nobel prize for his discovery of X-rays in 1901. R. pub. many papers on these, and other subjects, doing research connected with the magnetic notation of polarised light, the absorption of heat and gases, etc. See study by L. Zehnder, 1933.

Röntgen Rays, see X-RAYS.

Rood (A.-S. *rōd*), cross or crucifix, generally applied to the representation of the crucified Christ, with the figures of the Virgin and St. John standing on either side, which before the Reformation, was placed in Eng. churches at the entrance to the chancel and over a screen which is known as the R.-screen. Most Rs. were destroyed at the Reformation though more of the R.-screens survived, if often defaced. In some Anglican churches modern Rs. have replaced the medieval ones which were destroyed. A modern example of a R. is that in the Rom. Catholic cathedral at Westminster.

Rood (A.-S. *rōd*, a pole, or cross), measure of surface, the fourth part of a statute acre, and equal to 40 sq. poles or perches, or 1210 sq. yds.

Roo-de-poort, tn. of S. Africa, in the Transvaal, 25 m. N.W. of Johannesburg. It is the centre of the Witwatersrand goldfields, and has increased greatly in size and importance since 1930. Pop. (Europe) 23,000, (native) 30,000.

Roof, top covering of any building, designed for shelter from the sun, rain, etc., and for protection. Rs. are usually inclined, and slope downwards in each direction from a central ridge, but some Rs. are flat, or rather have only a small fall to let the water run off. These flat Rs. are usually covered with sheet lead or asphalt and are constructed after the manner of floors. Inclined or pitched Rs. are usually covered with slates or tiles, and are supported on rafters. In all except the smallest Rs. these rafters are supported by purlins which in turn are supported by trusses. The latter are triangulated frames made of strut and ties, and are of many types: king-post trusses, queen-post trusses, hammer-beam trusses, etc., but these three types of trusses or Rs. are now nearly obsolete. The hammer-beam truss, as in Westminster Hall, is noted for its architectural

quality rather than its structural efficiency. Steel is now mostly used for trusses, also reinforced concrete, though of recent years there have been developments in timber engineering and new types of timber Rs. are now being constructed. These new developments are chiefly due to the innovation of metal connectors and synthetic resin adhesives. The connectors are usually metal rings which enable strong and cheap joints to be made instead of mortise-and-tenon joints; and the new adhesives have led to the development of laminated trusses or arches which are made of a number of bent boards 'glued' together. A hipped R. has end pitches and therefore level eaves all round, whereas in a gabled R. the end walls of the building go up to meet the roof pitches, and there are only two slopes. A mansard R. has two different degrees of pitches, meeting at a curb, on each side of the ridge. See BUILDING.

Roof-boss, see Boss.

Rook (*Corvus frugilegus*), gregarious bird of the crow family which generally builds its rookeries near houses. The nest is a large structure, made with great labour, of twigs and straw, and in it are laid four or five bluish-green eggs blotched with greenish-brown. The adult male is about 18 in. long and the plumage is black with a purple gloss. The legs, toes, and claws are black. After the second moult the feathers round the base of the beak do not grow again, leaving the characteristic white patch in both sexes. Rs. are active friends of the farmer in that they destroy vast numbers of noxious insects, and the mischief they do is probably more than compensated by this service.

Rooke, Sir George (1650-1709), Brit. sailor, *b.* near Canterbury. He saw service against the Dutch, and was promoted to rear-admiral and commanded the squadron sent to relieve Londonderry. In 1699 he was engaged in the unfortunate action off Beachy Head. In 1692 he took part in the battle of La Hogue and led the night attack which led to the burning of thirteen Fr. ships. In 1693 he successfully resisted an attack on his convoy by the Fr. In 1702, with the rank of vice-admiral, he was in command of the expedition which captured or destroyed the Sp. treasure-ships and Fr. warships in Vigo Bay. In 1704, with Sir Cloudesley Shovel, he captured Gibraltar and successfully beat off an attack by the Fr. off Malaga.

Rookwood, tn. of New S. Wales, Australia, on Haslam's Creek, 10 m. S.W. of Sydney. There is a large cemetery, also brick-fields and meat-preserving works. Pop. 6000.

Roorkee, see RURKI.

Roosendaal, tn. of Holland, in the prov. of N. Brabant, 14 m. W.S.W. of Breda. Pop. 26,000.

Roosevelt, Anna Eleanor (*b.* 1884), Amer. politician, sociologist, and writer, *b.* at Pough-keepsie, New York, the daughter of Elliot R. and niece of Theodore R. (*q.v.*). She was educated privately. In 1905 she married Franklin Delano R. (*q.v.*), a distant cousin. After his election

to the presidency she became well known as a writer on current topics and as a public speaker, gaining popularity by her sympathetic, energetic personality and sincere persuasiveness. As a journalist she became famous for her column, 'My Day.' She was one of the U.S. delegates to the first United Nations Assembly in London in 1946, and in Dec. of that year she was nominated to the United Nations Commission on Human Rights. She became chairman of this commission, which, in June 1948, adopted a declaration setting out a common standard of human rights. Her pubs. include *My Days* (1938) and *If You Ask Me* (1948), both autobiographical.

Roosevelt, Franklin Delano (1882-1945), Amer. statesman and president, *b.* at Hyde Park, Dutchess co., New York, only son of James R., business man and country gentleman, and of Sara Delano, member of a Fr. family which left Leyden in the seventeenth century. President Theodore R. was a distant cousin. R. was educated at Groton and Harvard; he graduated in 1904. He studied law at Columbia Univ., and while there married Eleanor R. (*q.v.*). He was admitted to the New York Bar, 1907. In 1910, and again in 1912, R. was elected to the New York Senate on the Democratic ticket. Almost at once he made his name in the successful revolt against Tammany Hall over the election of a senator to Washington. Daniels, secretary of navy, invited him to take the post of navy assistant secretary, and in that capacity R. did much to increase the efficiency of the fleet. The Democratic Convention of 1920, which nominated Governor Cox to succeed Wilson, agreed that R. should be nominated for the vice-presidency, but his party was defeated and he returned to legal practice. In 1921 he was struck down by infantile paralysis. This might well have ended his career, but he bore the pain and deprivation with rare courage and gradually conquered both the disease and the physical incapacity it entailed, though he was never to regain the full use of his legs. Owing to his iron will and powers of resistance, however, he played a prominent part in the Democratic Convention of 1924 as a supporter of Alfred Smith. In 1928 he succeeded his old friend Smith as governor of New York State, an important office which raised him to presidential status, and was re-elected in 1930 by the highest majority ever given to a candidate for governorship. By the end of the second period of office in New York he had greatly enhanced his reputation by the just and fearless performance of his duties in the investigation of municipal affairs.

In the midst of the economic depression of 1932 the Republicans put forward Hoover (*q.v.*) for the presidential election of that year. At the Democratic Convention R. was nominated. As the campaign proceeded R.'s inspired nomination pledge of 'a new deal for the American people' seized the popular imagination. R. was returned with a majority of 4,000,000 votes and 480 of 531 in the electoral college. Before his inauguration,

while in Florida, an attempt was made on his life by a madman, and his companion, the mayor of Chicago, was killed.

R.'s inauguration speech was brief and announced immediate and drastic action. He soon convened Congress and, with his great Democratic support in both Houses, was able to pass through a vast programme of reform. His plans for national recovery covered the whole range of industry. There were complaints from business and other interests which felt themselves prejudiced by the 'New Deal' legislation (for full details, see NEW DEAL), but the President's proposals were carried through on a broad



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wave of popular support. Eventually there came a legal check, for the 'codes' which his National Recovery Act of 1933 had imposed upon employers were adjudged unconstitutional by the Supreme Court and therefore invalid; and his Agricultural Adjustment Act met the same fate. R., however, faced the setback with coolness, and in spite of the loss of legislation which, however, had already served much of its purpose, the New Deal continued.

War debts and disarmament posed serious problems of foreign policy. Following a visit by Ramsay MacDonald in April 1933 to discuss the world situation, R. issued a message to the states concerned in the disarmament and economic conferences, suggesting a definite non-

aggression pact. But this tentative approach to Amer. participation in international conferences came to nothing and the world economic conference (g.v.) of 1934 broke down on the problem of the stability of international exchange.

By 1935 R. could claim that his basic programme was substantially completed. He entered on the presidential campaign of 1936 against Alfred Landon full of confidence. Landon was not a formidable opponent, but ranged against R. were the combined resources of financial and industrial leadership and a large percentage of the newspapers. But the electorate returned him with a majority of 8,593,130 votes and with only Maine and Vermont against him in the electoral college. It was a victory beyond all precedent. At the opening of his second term he put forward proposals for a reorganisation of the executive so as to increase the effectiveness of the office of president. But he had to shelve his scheme for electing an additional judge to the recalcitrant Supreme Court, his critics asserting that he was tampering with the constitution. On foreign affairs, he sounded a warning note on world lawlessness. R. took what steps he could to reinforce the cause of peace, such as by extending his policy of the 'good neighbour' in relation to the lat. states of S. America—with gratifying results in 1941, when Japan attacked Pearl Harbour. On his visit in 1938 to open the new international bridge over the St. Lawrence he assured the Canadian people that the people of the U.S.A. would not stand idly by if Canadian soil were threatened by any other empire. In the same year he began more fully to exercise his influence in European affairs, sending appeals to Hitler during the Czech crisis (see CZECHOSLOVAKIA), urging the maintenance of peace, and helping to bring about the Munich Conference, though he had no illusions about the sinister character of Axis policies. At the beginning of 1939 he told Congress that he would take any step short of war to stop aggression, and his speeches at this period, while containing strong declarations of peace, contained yet stronger vindications of democracy. His policy, he declared, was the defence of civilisation against militarism, and he began to strengthen the material defences of the U.S.A. and ordered a comprehensive survey of Amer. industry. When Hitler seized the rest of Bohemia, R. made a last friendly bid to the Axis dictators, but it was abortive. Finally on Sept. 1 he begged the powers concerned to declare publicly that they would not bomb civilian peoples or unfortified cities. After this there was no course open to him but to declare America's neutrality (see NEUTRALITY ACT); but later the ban on armaments was relaxed under the 'cash and carry' plan. With the fall of France, however, the attitude of America began to change and demands for a large programme of national defence were made. R. announced that there could only be peace for America if they were 'prepared to meet force with force if the challenge is ever made.'

It was in July 1940 that he defined the 'four freedoms' (q.v.) as the aims to be satisfied if peace were to be restored to the world. Before the presidential election of 1940 R. declined, for some time, to say whether he would break with tradition so far as to stand for a third term. Meanwhile, however, he launched an immense programme for the production of munitions; transferred fifty destroyers to Britain in return for facilities to construct naval bases in the Brit. W. Indies and Newfoundland; and took two leading Republicans, Cols. Knox and Stimson, into his Cabinet. He took but little part in the election campaign against his opponent, Wendell Willkie, yet won easily, by a majority of 5,000,000 on the popular vote. He then introduced his generous lease-lend proposals, embodied in an 'Act to promote the Defense of the United States,' indicating that a better-armed Britain was essential to the liberties of his own people and plainly intimating that America would be 'the arsenal of democracy,' and emphasising the lesson of Woodrow Wilson that 'democracy could not survive in isolation.' In a broadcast on May 27, 1941, he announced that all measures necessary to the delivery to Britain of supplies would be taken (see LEND-LEASE). Later in the year he sent Amer. troops to Iceland and in Aug. he met Mr. Churchill at sea, the outcome of this meeting being the Atlantic Charter (q.v.). R. invited Congress to agree to a revision of the Neutrality Act, and also proved his determination to support Russia in her resistance to the Axis by a credit of \$100,000,000. On Dec. 7 came the Jap. attack on Pearl Harbour. On the following day he gave, in person, a message to Congress, calling for a declaration of war. Except for one member the answer was unanimous. And a few days later Congress accepted the challenge of the other two Axis nations.

R. now entered upon his career of war leader. Soon afterwards Mr. Churchill was in Washington to plan unity of action. This was the beginning of a wartime association based on mutual regard. As commander-in-chief it was R.'s task to make an isolationist people strategically minded and to interpret the conflict, not merely as an occasion to punish Japan, but as a world conflict, and this he accomplished despite criticisms from some sections of the press and the public. In April 1942 he proposed a seven-point programme to resist the rise in the cost of living and a large increase in taxation. The fear of inflation was always with him, the more so as Congress was somewhat reluctant to incur unpopularity by supporting R.'s drastic measures. By the summer he could validly say that America's reservoir of resources was almost at a flood stage and that huge quantities of supplies were being transported overseas for the assistance of the Allies. In Nov. 1942 came the landing in N. Africa, the suggestion of which great turning-point in the war was attributed by Mr. Churchill to R. Shortly after his

New Year Address in 1943 to Congress came his first budget for a hundred billion dollars, a measure of the nation's prodigious war effort. Soon afterwards R. was at Casablanca, with Mr. Churchill and Fighting Fr. representatives and a host of military and naval experts, at what he styled 'the unconditional surrender meeting' (using the historic words of Gen. Grant) in which every aspect of the war was considered. This was the first time an Amer. president had left his country in time of war. He also visited Brazil and Mexico on his way back to the U.S.A. In America he was faced with labour troubles, particularly in the mines. An Anti-Strike Bill which he vetoed was passed despite his veto, and he had other set-backs in domestic policy. Earlier in the year he had invited Mr. Churchill to Washington, when full agreement was reached on all points 'from Great Britain to New Britain and beyond.' In Nov. he went to Cairo and, with Mr. Churchill and Gen. Chiang Kai-shek, discussed future military operations against Japan. With Mr. Churchill R. then travelled to Teheran, where he met Marshal Stalin for the first time. On his return journey R. visited Cairo again for discussions with the Turkish president, and touched at Malta and Sicily. Early in Jan. 1944 he and Mrs. R. presented their homestead at Hyde Park to the U.S. Gov. as a historical national site. This followed upon an earlier gift of the Roosevelt Library there. In the same month he introduced his second budget for a hundred billion dollars. By now the Legislature had become largely hostile to his social policy, particularly in relation to taxation. It's description of the Tax Bill, which he vetoed, as relief 'not for the needy but for the greedy,' was an appeal over Congress to the people. In April 1944 he had to take a rest, but on his return to the White House, apparently well, the Democratic National Committee announced that he would accept the nomination for the fourth term, though R. himself declined to be drawn. In May he outlined the Amer. plan for a world security organisation, something which would be a 'new and better League of Nations' in the post-war world. On July 20 the Democratic Convention nominated him for president, following his announcement on July 11 that he would serve if elected. In the same month he was in Honolulu and also visited the Aleutians and Alaska. In Sept. he went to Quebec to meet Mr. Churchill. He made only one political speech in this presidential campaign. The result was once again a decisive victory for R. Though Dewey, his opponent, had some strength in the rural dists., the workers in the urb. centres were overwhelmingly for R. and in both Houses of Congress he had safe majorities.

Early in 1945 his message on the state of the union was read to a joint session of Congress. It was a masterly and far-ranging review of the military situation. His brief fourth inaugural address, on Jan. 20, 1945, was the first wartime presidential message since the time of Abraham

Lincoln. In Feb. he was at Yalta in the Crimea where, with Churchill and Stalin, complete agreement was reached for joint military operations in the closing phase of the war against Germany. He had accepted joint responsibility with Britain and Russia for the solution of the political problems in Europe. He now looked forward to participation in the San Francisco Conference, but, while final arrangements were being made, he died suddenly at Warm Springs.

R.'s place in hist. in relation to the greatest of other Amer. presidents has yet to be assessed, but the fact that he was four times decisively elected is one important factor to be noted. The two great and protracted crises in Amer. hist. through which he piloted the nation must have involved a searching test of character and consummate statecraft, and in both crises he retained the confidence of the great majority of his fellow countrymen. His triumph over the great economic depression of the 1930s would in itself have assured his fame in the roll of Amer. presidents. But though the aims of his liberal policy required an era of peace he revealed equally remarkable gifts in the calamity of war. With all his personal hatred of Axis tyranny he knew well that his foresight must not lead him to act too far ahead of public opinion, nor indeed was the nation fully united behind his war policy until the awakening of Pearl Harbour. That event only strengthened the realisation of his powers as a trusted interpreter of world events, and from that time, free from the restrictions that had hampered his course, he quickly became not merely the commander-in-chief in war, but a national war leader and an inspiration to the world of democracy. In council with other great war leaders overseas he enjoyed all the prestige due to his personality and to the fact that a nation stood firmly behind him. Nor did he lack the skill of the shrewd politician, able to gauge a situation with intuitive understanding. A man of R.'s stature was bound to arouse violent animosity as well as deep affection. Though as war leader he led a united America, his domestic policy was always bitterly opposed by certain sections. Some of his measures aroused, among the opposition, a bitter personal hatred. Slurs continued to be cast on his memory after his death. He was maliciously accused of vanity, extravagance, and ruthless ambition. No standard biography of R. has yet appeared. Memoirs pub. since his death have not generally confirmed the impression of paramount greatness which R. seemed to possess during his lifetime. Critics have occasionally suggested, perhaps somewhat superficially, that it was events which made R. great, that but for the upheavals of the world in which he lived, he would have been only an efficient administrator. But this could be said of most wartime leaders with varying degrees of truth. R. himself never claimed to be more than the people's representative. Final judgment may decide that R.'s greatness lay in his courageous solutions

of difficult situations, and in his capacity skilfully to guide and interpret the will of a great complex nation, which transformed the isolationist tradition of the U.S.A. in foreign affairs into a realisation of the nation's international obligations and its intimate concern with the fortunes of all other nations. After the war the Brit. Parliament, on the suggestion of the late Lord Derby, passed the Roosevelt Memorial Act, empowering the gov. to maintain in perpetuity a statue of President Roosevelt and its site in Grosvenor Square, London. The Pilgrims Society was responsible for raising the funds, the sum aimed at being £10,000, in subscriptions limited to 5s., so that as many persons as possible could subscribe. The memorial was unveiled by Mrs. R. in the presence of the king and queen on April 12, 1918, the third anniversary of the President's death. The memorial statue is in grey-green bronze and, with its pedestal, is nearly 12 ft. high. It is the work of the sculptor Sir Wm. Reid Dick, R.A., the gardens and lay-out being that of the architect, Mr. B. W. L. Gallanough. See also *LEND-LEASE*; *NEW DEAL*; *WORLD WAR, SECOND*, etc. See lives by G. W. Johnson, 1942; Frances Perkins, 1946; and L. H. Kiernan, 1948. See also B. Rauch, *History of the New Deal*, 1944; Elliot Roosevelt, *As He Saw It*, 1946; *Nothing to Fear: Selected Addresses of Franklin Delano Roosevelt* (ed. by B. D. Zevin), 1947; D. Webster, *Age of the Great Depression*, 1948; R. E. Sherwood, *The White House Papers of Harry L. Hopkins* (vol. 1), 1948; and E. R. Stettinius, *Roosevelt and the Russians*, 1948.

Roosevelt, Theodore (1858-1919). Amer. president, b. Oct. 27, in New York city, descendant of an old Dutch family which had settled in what is now New York State in 1649. His father had been collector of the port of New York. The future president went to Harvard Univ., graduating in 1880. He then studied law, but was attracted to politics, and was elected to the New York State Legislature in 1881. In 1889 President Harrison made him a member of the U.S. Civil Service Commission, and in 1895 he was police commissioner of New York city. In 1896 President McKinley named him assistant secretary of the navy. R. was ardently in favour of war with Spain, and did much to put the navy in a state of preparedness. After war was declared, R., with his friend Dr. Leonard Wood, then a surgeon in the U.S. Army, raised the volunteer regiment which became famous as the Rough Riders. R. resigned his navy post to join his regiment. In 1898 he was elected governor of New York State. Nominated vice-president on the Republican national ticket (1900) R. succeeded President McKinley on the latter's assassination (Sept. 6, 1901). In 1904 he was re-elected, 't did not seek a third term in 1908, when he was succeeded by W. H. Taft. The biggest positive feature of R.'s presidency was the Hay-Pauncefote (q.v.) treaty, which made possible the Panama Canal scheme. In 1905 R. intervened in the Russo-Jap. war, and induced

the warring countries to send delegates to Portsmouth, New Hampshire, where a peace was signed. For this he was awarded the Nobel peace prize in 1906. R. was a voluminous writer. Among his best books are *Hunting Trips of a Ranchman* (1886); *The Rough Riders* (1899); and



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autobiography (1913); and historical books on the winning of the great West, and on the war of 1812. See lives by J. A. Riis, 1904; N. M. Butler, 1919; W. R. Thayer, 1919; and H. Pringle, 1932.

Root, Elihu (1845-1937), Amer. statesman, b. at Clinton, New York, and educated at Hamilton College and elsewhere. He studied law, and held degrees of sev. univs. R. participated as counsel in sev. important cases, proving very successful as a pleader, and held official legal positions. He was secretary of war in McKinley's Cabinet (1899-1904), dealing with success with the insurrection in the Philippines. He was secretary of state under Roosevelt (1905-9), and entertained diplomatic relations with S. America and elsewhere. R. was elected as senator (Republican) for the term 1909-15, and was a peace advocate, and member of Permanent Court of Arbitration at The Hague. He was a Nobel peace prize winner in 1912.

Root, one of the three distinct parts of nearly all pteridophytes (ferns and their allies) and spermatophytes (seed-bearing plants, including angiosperms), the other parts being stem and leaves. True Rs. do not occur in the byrophytes (mosses and liverworts) or in the thallophytes (algae and fungi). Usually the R. penetrates into the soil, fixing the plant there and absorbing the various inorganic food materials essential to it. All that part of the plant which is underground is not necessarily the R. A number of plants, such as mint, potato, and hop, form underground stems. A primary R. is that

formed on the germination of a dicotyledonous seed by the growth of the radicle, and this may give off secondary Rs., from which a third series may arise, and so on. In some plants, especially biennials, the primary R. grows more strongly than the secondary R., becoming thickened into a tap R., which is conical as in the carrot, fusiform as in the radish, or napiform as in the turnip. In these plants food is stored as sugars and other carbohydrates, giving them their value as human and animal food. A fibrous R. is a much-branched system, the primary R. having been arrested in its development. Adventitious Rs. are secondary Rs. formed from the stems and other parts of the plant. Aerial or sub-aerial Rs. are those, mostly of adventitious character, which do not grow down into the ground, but remain partially or entirely in the air; e.g. those that arise from the climbing stems of the ivy, and those formed by many tropical orchids and other epiphytes. In some instances, such as the banyan tree and mangrove tree, sub-aerial shoots are produced which ultimately penetrate into the soil. At the tip of a R. is a protective *R. cap.*; behind this is the growing region and then the region bearing the absorptive *R. hairs*.

Root, in algebra, quantity from which a power is derived; r is the n th root of r^n ; the n th root of r is represented by $\sqrt[n]{r}$. The roots of an equation are those quantities which, when substituted for the unknown quantities, 'satisfy' the equation.

Root and Branch Men, those extremists of the parl. party who upheld the Root and Branch Bill and Petition of 1641. This Bill provided that episcopal government, 'with all its dependencies, roots, and branches, be destroyed.' Among its adherents were Hampden, Sir H. Vane, and Cromwell.

Root Pruning of fruit trees is beneficial where they tend to make too much growth at the expense of fruit production. A trench is opened in the soil 2 or 3 ft. wide half-way round the tree. Fibrous roots that cross the trench are left untouched, but roots more than half an inch thick are cut through with a saw and dressed with gas tar. If the soil is poor it can be enriched with ash and well-rotted manure when the trench is filled up. The following year the other half of the roots is similarly treated. The best period for the operation is between Oct. and Feb., the earlier the better.

Root Tubercles, or Nodules, colonies of bacteria which live in partnership (*symbiosis*) with leguminous plants, receiving from them sugar which they oxidize to effect the combination of free nitrogen, returning to the plants nitrogen compounds. Hence the practice of ploughing in clover, etc., to enrich the ground with combined nitrogen. This practice is very old, having been mentioned by Virgil in his *Georgics*. The bacteria in question are *Bacillus radicicola*; they are motile and rod-shaped.

Rope and Rope-making. Rope is a term applied to the larger varieties of

twisted fibre, usually those one inch or more in circumference. The general term for fibre made hauling or lashing material is 'cordage', 'thread' is composed of two or three twisted yarns, 'twine' is made of a dozen yarns or so, 'cord' is made of three or more strands each consisting of a few yarns, 'rope' is made of strands containing a large number of yarns. The general method of manufacture is the same in all cases: the yarns are twisted together so that the tenacity of the whole may be increased by the friction engendered, the strands are then twisted around each other in the opposite direction to the twist of the yarns. A 'hawser laid' rope consists of three strands, a 'cable' or 'cable laid' rope is composed of three such hawsers twisted together. A 'shroud laid' rope consists of a central strand with three or four strands twisted around it. Cordage is sometimes plaited to secure greater pliability, as in fishing lines, window cord, clock cords and the most modern types of driving ropes. Many different fibres are used in rope making. Jute, on account of its cheapness is used for twines and cords and, mixed with other fibres for various qualities of rope. In general its tenacity is durable, but not sufficient to fit it for the best qualities of rope. Common hemp is the most commonly used fibre, but Manila hemp which is tenacious but somewhat stiff sisal hemp phormium hemp gunn hemp etc. are also used a great deal. The prime fibres for marine use are Manila and sisal which have greater strength and stand up to salt water better than other fibres. Jute is never used for this purpose as it has not sufficient strength nor does it stand up to immersion in water. Coir fibre is used for rope making locally cotton ropes are employed for diving wheels while iron and copper enter into the composition of 'ropes' and 'cables' for rigging and for electrical purposes. The process of rope making may be enumerated as huckling, spinning, tarring (where necessary), forming strands and laying the rope. The object of huckling is to separate the fibres in the tangled 'streak' and to lay them parallel to one another. The longer fibres are then spun together to form yarn. Spinning is now done by machinery, although formerly it was a manual process requiring much skill. Tarring which is necessary only for ropes which will become alternately wet and dry is done by passing the yarns through tar heated to about 220° K and afterwards removing the excess of tar by a squeezing machine. The yarns are wound on bobbins after being spun. The thread is passed from the bobbins through holes in a register plate so arranged that the threads intended to form each strand pass through holes disposed in concentric rings. From the register plate the threads for each strand pass into a funnel whose further diameter is that of the strand. Each group of threads is attached to a revolving hook on a machine called a 'traveller', which moves on rails at a uniform speed away from the bobbins, so that the three strands are twisted at the

same time. A carriage containing a 'top' is used for laying the strands together to form the rope, thus taking the place of the walking spinner. Driving ropes are usually of cotton or of plaited sisal hemp. Nylon (qv) ropes are now used in mountaineering, being exceptionally strong and light in weight. Nylon rope was used in the Second World War for towing gliders. Aerial ropeways are usually made of wire rope more or less flexible, according to the system adopted. The flexibility of wire rope depends upon the number of wires to the strand, and ropes are now made of such a degree of flexibility that they can be used for most of the purposes of humpen rope. Their great advantage is their greater strength in proportion to diameter and weight. See P J Stopford *Cordage and Cables*, 1925.

Roper, William (1496-1578) biographer of Sir Thomas More (qv), whose daughter Margaret he married. His biography, written 1535, was pub in Paris 1626. It is remarkable for its simplicity and pathos, and also for its well constructed English. There is an ed in Everyman's Library.

Rope trick, most discussed trick that Indian jugglers or 'magicians' are said to perform. It is supposed to be performed as follows: the magician takes one end of a coil of rope high into the air where it stays drops the rest of the coil on the ground, moistens his hands, climbs up the rope, and vanishes. While the onlookers are gazing upwards wondering what has become of him the juggler unconcernedly reappears amongst them.

Rogue, or Roch St (1293-1327) French saint, patron of those suffering from plague. He was b in Montpellier France and wandered through France, Germany, Spain, and Italy, ministering to the sick.

Roquefort, vil in the dept of Aveyron France, 45 m NW of Beziers. It is 1970 ft above sea level. It is famous for its cheese, the vil lying among the limestone *causses* which provide rich grazing ground for the sheep, and there are natural caverns kept evenly damp by underground watercourses in which the cheese is matured. Real Roquefort is made of the milk of ewes (chiefly Lacaune breed) only and has a blue in the white texture. The morning and evening milk is mixed with rennet from lambs' stomachs, and the cheeses are matured for from one to five months in the caverns at a temp of 41° F.

Roraima, Mount, flat topped mt mass at the boundary point of Brit Guiana, Brazil and Venezuela. It rises in terraces with perpendicular rocky walls from 1500 ft to 3000 ft high and the top is covered with irregular ridges and peaks, the highest reaching a height of 8740 ft above sea level. Numerous streams rise in the summit and make one of the highest waterfalls in the world. It was first scaled by H. J. Finlay in 1885.

Rorke's Drift, place on the Finguela, Natal, S Africa, 23 m from Dundee. At R. D. a handful of Brit troops made a stand against a Zulu army on Jan 22, 1879.

Rorqual, see FIN WHALES.

Rosa, Carl August Nicholas (1843-89), Ger.-born Eng. impresario, b. in Hamburg, his father's name being Rose. He studied at the Leipzig and Paris conservatoires, and became orchestral leader at Hamburg. In 1867 he married Euphrosyne Parepa, a fine operatic soprano. The Carl Rosa Opera Company, which he started in England in 1875, not only popularised foreign operas in England by producing Eng. versions, but also encouraged native talent by presenting Eng. works.

Rosa, Salvator (1615-73), It. painter, b. at Aronella, near Naples; he studied art under his uncle Paolo Greco, and his father-in-law, Francesco Francanzuro. It was in Naples that Lanfranco bought his 'Hagar,' and so started him on a career of success and prosperity, and it was here that, in company with his good friend, Aniello Falcone, he joined in Masaniello's abortive insurrection (1647). At Rome, on the other hand, he sang and acted in the Carnival (1639), and here he painted the great 'Battlepiece' for Louis XIV. and the famous 'Saul and the Witch of Endor.' His trenchant satires, including *Babylon*, which was obviously directed against Rome, were penned in Florence, where he lived from 1647 to 1652, secure from the terrors of the Inquisition, with which he was threatened for his *Wheel of Fortune*. His conceit is pardonable in view of the sterling merits of his historical pictures, and even portraits, no less than his romantic and picturesque landscapes. See life by B. Caffaneo, 1929.

Rosa, Monte, the highest mt. in Switzerland, the chief peak, the Dufourspitze, being 15,217 ft., and a second peak, the Nordend, 15,132 ft. in height. A third peak, Punta Margherita, is in Italy, and was once the site of an observatory. Ascent on the Swiss side is from the Bêteemps hut and on the It. from Macugnaga. It is situated on the frontier between the canton of Valais, Switzerland, and the It. provs. of Novara and Turin. The name M. R. means 'mountain of ice.'

Rosacea, see ACNE.

Rosaceae, large and widely distributed family of trees, shrubs, and herbs, among the fruits of which are apple, pear, plum, cherry, apricot, peach, strawberry, and raspberry, while many bear flowers of great beauty and fragrance.

Rosamond, Fair, see CLIFFORD.

Rosamund, see under ALBION.

Rosaniline (tri-aminotolylidiphenyl carbinol, $C_{18}H_{15}N_3.OH$), organic base forming salts of value in dyeing. The term R. is in commerce applied to the chloride, fuchsin, or magenta, which possesses a brilliant red colour, although the It. base is colourless. The chloride is formed by adding hydrochloric acid and nitrobenzene to a mixture of aniline, ortho-toluidine, and para-toluidine; the whole is heated to 190° C., small quantities of iron filings being added during the process. R. dyes silk, wool, and tanned cotton a brilliant red, but the colour is not very fast, so R. is generally employed as an intermediate in the manuf. of faster dyes, such as aniline blue.

Rosapenna, seaside resort of co. Donegal, Eire, with a golf course and excellent bathing beaches. Tranarossan Bay is 3 m. distant.

Rosario: 1. City and riv. port on the Parana, 175 m. by rail N.W. of Buenos Aires in the prov. of Santa Fé, Argentina. By riv. the distance from Buenos Aires is 203 nautical miles. R. is primarily a centre for the transport overseas of the agric. produce of the central and N. provs. The staple export is wheat, and after that flour, sugar, linseed, and cattle. The quays and wharves are used by ocean steamers up to 10,000 tons and by riv. boats, and there are excellent railroad facilities. R. has made great strides since 1854, and is now the second city in Argentina. It has large sugar refineries, and also grain elevators, flour-mills, saw-mills, furniture, packing works, tanneries, bricks, tobacco factories, and printing works. The streets are wider than those of Buenos Aires, and there are sev. imposing boulevards and fine open spaces. A concrete paved road, on the route to Cordova, joins R. to Buenos Aires via Pergamino. Pop. (urb.) 161,700; (with suburbs) 522,400. 2. Tn. of Mexico, with gold and silver mines, 40 m. S.E. of Mazatlan in Sinaloa. Pop. 7000. 3. Tn. of Uruguay, S. America, in the dept. of Colonia, 110 m. by rail from Montevideo and 40 m. by rail from Colonia del Sacramento holiday resort. Its products of wheat, maize, and dairy produce are shipped from the port of Juan Lacaze. Pop. 8000.

Rosary, or **Prayer-beads**, string of beads on which are counted the number of 'Hail Marys' and 'Our Fathers' which go to form the devotion also known as the R. This devotion consists of fifteen decades, each consisting of one 'Our Father,' ten 'Hail Marys,' and one 'Glory be.' The actual R. consists of five such decades of beads, and to complete the devotion it is said three times. The traditional ascription of the origin of the R. to St. Dominic has been controverted (see *Catholic Encyclopedia*, xiii. 184). Certainly beads were in use before his time, and the repetition of a set number of 'Our Fathers' and 'Hail Marys' was common. The number of 150 'Hail Marys' was chosen in imitation of the 150 Psalms. The devotion is popular in the Rom. Catholic Church but not used outside it. Similar methods of counting repeated prayers are found in other religions, e.g. the Buddhists.

Rosas, Juan Manuel (1793-1877), Argentine statesman, b. in Buenos Aires. He trained an effective fighting force on his cattle run at Los Cerrillos, and, by effectually employing it in political strife, at last became tyrant of Buenos Aires. He was dictator from 1835 to 1852. He failed to force the Plate R. states into the confederation which he had organised and, after he was defeated by Urquiza at Monte Caseros, he took refuge in Southampton (England), where he died. He had ruled with exceptional ruthlessness and cruelty.

Roscelin, or **Roscelin**, **Johannes** (c. 1050-c. 1120), Fr. theologian, b. at Compiègne.

He played an important part in introducing Nominalism into the medieval schools. R. was a follower of Abelard. His speculations led him into conflict with the Church, and in 1092 his teachings on the Trinity were condemned by the council of Soissons. See study by F. Picavet, 1911.

Roscius, Quintus Gallus (d. c. 62 B.C.), Rom. actor, a slave of Solonum. A past-master in gestures, enunciation, and grace, he was in comedy the equal of Æsopus in tragedy. Sulla gave him a gold ring, the symbol of knightly rank, and Cicero was his devoted friend, pleading for him in a lawsuit. R. was noted for the naturalism of his art.

Roscius, Young, see BETTY, WILLIAM HENRY WEST.

Roscoe, Sir Henry Enfield (1833-1915), Eng. chemist, b. in London, and educated at London and Heidelberg Univs. At Heidelberg he formed a lasting friendship with Bunsen, whose associate he was in the development of comparative photochemistry. He was prof. of chem. at Owens College, Manchester, from 1857 to 1887. R. represented a Manchester constituency in Parliament from 1885 to 1895, and was vice-chancellor of London Univ. from 1896 to 1900. Besides making researches on vanadium, he was joint-author with Schorlemmer (d. 1892) of a standard treatise on chem. (1877-84). R. was knighted in 1884. He pub. an autobiography in 1906.

Roscoe, William (1753-1831), Eng. historian, b. at Liverpool. He practised for some years as an attorney, but in 1774 abandoned the profession of law for that of literature. His prin. works were *The Life of Lorenzo de' Medici* (1795) and *The Life and Pontificate of Leo the Tenth* (1805), both of which achieved remarkable success. He also wrote the nursery classic *The Butterfly's Ball and the Grasshopper's Feast* (*Gentleman's Magazine*, Nov. 1806), which inspired Beau Brummell to write *The Butterfly's Funeral*. See life by Henry Roscoe, 1833.

Roscoff, fishing vil. of Brittany, France, in the dept. of Finistère. It has a zoological laboratory, and is also a seaside resort. The church of Notre-Dame-de-Croaz-Baz (1550) has an unusual tower, like a minaret. There is a ruined chapel to St. Ninian (1573) built by Mary Queen of Scots in commemoration of her landing at R. Pop. (com.) about 4509.

Roscommon, Wentworth Dillon, Earl of (c. 1633-85), called by Dr. Johnson one of the benefactors of Eng. literature, was b. in Ireland. He was the first critic who publicly praised Milton's *Paradise Lost*. His chief work was *Essay on Translated Verse* (2nd ed., enlarged, 1685).

Roscommon, inland co. of Eire, in the prov. of Connaught, bounded on the N. by Sligo, S. by Galway, E. by Longford and Westmeath, and W. by Mayo and Galway. It was estab. as a co. about 1580. It is 60 m. long and 37 m. broad, with an area of 990 sq. m. and a pop. of 77,500. There are some extensive bogs and numerous lakes, Loughs Boderg, Allen, and Ree being the largest. Agri-

culture is the leading industry. R., the cap., is a mkt. tn., 92 m. W. by N. of Dublin. At Castle Strange is a sculptured standing stone of the Early Iron Age. R. contains the remains of a Dominican priory and a castle dating from the thirteenth century. Pop. of tn. 2,000. Other important tns. are Castlereagh, Elphin, and Boyle.

Roscommon Bred, see SHEEP.

Roscrea, mkt. tn. of Tipperary, Eire, 32 m. N. of Cashel. In the seventh century St. Cronan founded an abbey at R. It contains the ruins of sev. eccles. structures and castles, besides a round tower, an anct. cross, and other historical relics. There is also a large modern Trappist monastery here, with a school and agric. college attached. Pop. 3000.

Rose, Hugh Henry, see STRATHNAIRN, BARON.

Rose, John Holland (1855-1942), Brit. historian, b. at Bedford and educated at Owens College, Manchester, and at Christ's College, Cambridge. He became first Vere Harmsworth prof. of naval hist. at Cambridge in 1919, and was a leading authority on Brit. hist. of the Napoleonic period. His pub., of which sev. have become standard works, include *Life of Napoleon I.* (1902) and *William Pitt and the National Revival* (1911). He bequeathed a sum to Christ's College for the endowment of a scholarship to encourage the study of recent Brit. imperial hist.

Rose of Lima, Saint (1586-1617), S. Amer. Rom. Catholic saint, patron saint of S. America and the Philippines, b. at Lima, Peru, of Sp. descent. She lived the life of a Dominican tertiary in her own home, her life being a replica of that of St. Catherine of Siena (q.v.), and she possessed, like St. Catherine, extraordinary mystical gifts. She was canonised in 1671, the first person of Amer. birth to be declared a saint. Her feast-day is on Aug. 30.

Rose (Rosa), large genus of flowering plants in the family Rosaceæ, unsurpassed for the beauty and fragrance of their blooms. In the culture of the numerous species and almost countless varieties for the sale of plants, the production of cut blooms, and the manuf. of atar of Rs. and other perfumes, many thousands of people are employed. There are ten to fifteen Brit. species, which hybridise with one another somewhat freely; the best known are the Dog R. (*R. canina*) and the very fragrant Sweet Briar (*R. rubiginosa*). Among the numerous cultivated species are *Banksia*, the white or yellow *Banksia*, R., valuable for walls; *bracteata*, the dwarf white-flowered Macartney R.; *centifolia*, the Cabbage R., with its many fine varieties, including the Moss R.; *damascena*, the Damask R.; *indica*, the China or Monthly R.; *hutea*, the Austrian briar; *moschata*, the Musk R.; *multiflora*, or *polyantha*, a group of valuable climbing Rs.; *rugosa*, the Jap. R.; *sempervirens*, the Evergreen R.; and *Wichuraiana*, another group of beautiful climbers. The latest development is the new race of Rs. known as the Hybrid Polyantha, a cross between

the Polyantha Pompon and the Hybrid Tea. This race is remarkable for its vigour and free flowering habit. Rs. can be planted from November to March, the earlier the better; they do best in a heavy loam or friable clay, the roots being spread out and covered with a few inches of fine soil, the hole being filled with ordinary soil well trodden in. Hard pruning in the spring after planting is advisable, and afterwards pruning is regulated by the amount of ann. growth. There are numerous methods of propagating Rs.: budding is the most frequently practised. Cuttings are easily struck in Sept., and many kinds can be increased by layering. Grafting and seed raising are methods more commonly practised



TYPICAL BUSH-RO-1
Rose acicularis, Lindley

by the R. breeder. See J. H. Pemberton, *Roses, their History, Development, and Cultivation*, 1908; G. M. Taylor, *Roses, their Culture and Management*, 1945; S. C. Bradford, *The Romance of Roses* (3rd ed.), 1947; publs. of the National Rose Society, London, S.W.1, issued to members, which deal with the various phases of R. growing. This, the largest specialist society of its kind in the world, the membership of which now totals 23,000, has as its object: 'To encourage, improve, and extend the cultivation of the Rose by means of publications, exhibitions, and other activities'.

See also BRIAR and ROSE HIPS.

Rose, in heraldry, charge appearing in the earliest period of heraldry (e.g. for the Lords Darcy, thirteenth century). Although often described as 'conventional' the heraldic R. is an exact reproduction of the wild rose of the hedgerow, i.e. with five petals displayed. Under Henry VII. it began to be shown with a double layer of petals, and in the later Tudor period was often blazoned as 'slipped and leaved' (with stalk and at least two leaves). When blazoned as 'proper' the R. is Gules with the centre seeds Or and the calyx Vert.

Rose Acacia, *Robinia hispida*, tree 5 to 6 ft. high, with rosy flowers in spring.

Thrives in most soils, if not stiff and damp. See ROBINIA.

Rose Apple (*Eugenia jambos*), Malayan evergreen tree of the Myrtaceae family. It grows between 20 and 30 ft. high, has oval, leathery leaves, and clusters of small, four-petalled, white flowers. The red berries contain one or two poisonous seeds, embedded in a rose-scented pulp.

Roseau, cap. of Dominica, Brit. W. Indies, on the W. coast of the is. From R. bananas, coco-nuts, limes, rum, etc., are exported. Pop. 9800.

Rose Beetle, or **Green Chafer** (*Cetonia aurata*), brilliant copper-green beetle, with pale creamy marks on the wing cases. It eats the petals and foliage of roses and other plants, and the grubs or larvae attack the roots. The beetles appear in May and deposit their eggs in the ground. The white grubs resemble those of the cockchafer, and they pupate in earthen cells. When they are present in numbers, the soil about the roots should be examined for grubs.

Rosebery, Archibald Philip Primrose, fifth Earl of (1847-1929), Brit. statesman, b. in London, son of Archibald, Lord Dalhousie (d. 1851), his mother being a daughter of the fourth Earl Stanhope, and educated at a preparatory school at Brighton and at Eton. In 1866 he entered Christ Church, Oxford. He succeeded his grandfather in the earldom, 1868, and he left Oxford in the same year without a degree. R. was a keen scholar, and was from youth a collector of books and MSS. His thoughtful speeches attracted notice, and in 1871 he was selected to second the reply to the speech from the throne; during Disraeli's last term of office he criticised Lord Salisbury and supported the cause of Greece. In 1878 he married Hannah, daughter of Baron Meyer Rothschild. The same year he was elected lord rector of Aberdeen Univ., in 1880 of Edinburgh Univ., and in 1899 of Glasgow Univ. He was under secretary to the Home Office from 1881 to 1883. In 1885 he was in the Cabinet as lord privy seal and first commissioner of works. He was foreign secretary for six months in the brief Liberal administration of 1886, and in that time he had to deal with three international crises. In Oct. 1888, at Leeds, he made a speech which laid down the principles of a Liberal imperialism. In 1889, when the London Co. Council came into existence, R. became its first chairman. In 1892 he was invited by Gladstone to return to the Foreign Office, which with some reluctance he did. In March 1901, after Gladstone's resignation, he accepted the premiership as first lord of the treasury and president of the council; he resigned in June 1895, after defeat in the Commons over cordite. In 1896 R. resigned his leadership of the Liberal party, which the Radical wing had always disliked. The breach was widened by his attitude on the S. African war, when he declined to accept Campbell-Bannerman's policy. He was shocked by the Lloyd George budget of 1909, but took no definite position as to the policy of the Lords. In 1911 he

received the United Kingdom earldom of Middlethorpe. During the First World War he occasionally made patriotic speeches. It was as a maker of non political speeches that R. charmed everybody many such are included in his *Miscellaneous Literary and Historical* (1921). In retirement he devoted much time to literature. He had already pub *Pitt* in 1891, and other pubs include *Sir Robert Peel* (1899), *Oliver Cromwell* (1900) and *Lord Randolph Churchill* (1906) and *Chatham* (1910). Among R's wide interests was the turf, he did much to raise the prestige of Eng horse racing, and his horses won the Derby in 1894, 1895, and 1905. This interest was among others which made him unpopular among the rank and file of his own party. His imperialist ideas always rendered him suspect, and he had not the drive essential to the effective political leader. On politics his attitude was more that of the detached observer than of the urgent partisan, and though he could speak with effect in the House of Lords he lacked the manner to appeal to the crowd which Gladstone had made a part of the Liberal tradition. His real brilliance is to be found in his historical and literary pubs. † In his political achievement. See lives by J. I. Raymond 1923 E. H. Thurston 1928 and the Marquis of Crewe 1931.

Rose-coloured Starling, see PARSOR
Rosegger, Peter Kettenfeiler (1843-1918) Austrian poet, b at Alpl in Styria son of a peasant and largely self educated. He soon attracted notice by his poetry, which is of a romantic order and he attained great popularity in Austria and Germany as novelist, poet and playwright. His finest work was the *Waldheimat* (1877). An Eng trans by M. K. King was pub. in 1912. See lives by R. Huttensteiner 1924 M. Schwartz, 1935 and O. Janda 1943.

Rose Hips, fruit of the bristly wild dog rose and cultivated garden roses are a rich source of vitamin C i.e. the most valuable being the large berries of *Rosa mollis*. For home consumption the berries are best left on the bushes until after the first frost has softened them. Care should be taken in handling and they should be kept from extremes of temp. and air and away from metal. The hips should be washed and may be made into a puree by cooking in water in a covered pan sieving, adding sugar, re-boiling and sealing in jars the puree should keep for many months. If a syrup is required the puree should be diluted with water and strained through flannel. Raw fruit puree is richer in vitamins but not so reliable for keeping. The berries should be very ripe, halved, and soaked till soft, sieved and warm sugar well stirred in and the puree put immediately into jars and sealed. Dried or dehydrated berries are easy to store. They should be halved and dried, after which the hairs and pips may be easily removed. When required for use they should be soaked for two to four days, rubbed through a sieve, and sugar added. See Claire Loewentfeld, *Britain's Wild*

Jardner (London Health Centre, Leaflet No 3).

Rosellino, Antonio (c 1427-c 1479) It sculptor b at Florence. His master piece, a tomb for the young Portuguese prince and cardinal who died in 1459 is still in existence and undamaged. The carving on this beautiful monument like the marble medallion relief of the Virgin and Child now in the Bargello at Florence suggests that Rosellino had more refinement if less force than Donatello.

Rose-Mallow, see HIBISCUS

Rosemary, or *Rosmarinus officinalis* labiate plant found in Britain. It is an evergreen shrub cultivated for its flowers and leaves, from which oil of R. is distilled in France and Spain. *Ledum palustre* a species of Ericaceae is sometimes called the marsh R.

Rosenberg, Alfred (1893-1946) Ger National Socialist politician and writer b at Rival (Lahn). He went to Munich in 1918 and was one of the first members of the National Socialist party, becoming editor of the *Volksischer Beobachter* in 1921. In books, pamphlets and newspaper articles he built up a Nazi ideology founded on anti-Semitism and pagan Teutonic mythology and mysticism. In 1941 it was appointed minister of occupied E. Prussia. He was hanged for war crimes being a leading defendant at the Nuremberg trials. His most famous pub was *Der Mythos des Dritten Reichs* (1930).

Rosenberg, Siegfried

Rosenheim, town of Bavaria, Germany, on the Inn 40 m S.E. of Munich. It is much frequented for its saline and sulphur baths. Its architecture shows marked influence. Salt is produced. Industries include paper machinery and glass-making. Pop. 21,300.

Rosenthal, Moriz (1862-1946) Polish pianist b in Lemberg; he studied there and in Vienna. He gave his first recital in Vienna in 1876 and between 1877 and 1880 he visited Weimar, Rome, Paris and St. Petersburg with Liszt. Later to become the friend also of Brahms. In the technique of piano playing R. was unsurpassed; he could play all of Chopin's compositions from memory. Of his own compositions his *Pavlova's* (1897) is exquisite.

Rose of Jericho, or Resurrection Plant (*Frankia hierochuntica*) small half hardy ann. (family Cruciferae) bearing small white flowers and sometimes grown in light garden soil. It grows during the rainy season in the sandy deserts round the Mediterranean and during the dry season shrivels up though retaining its vitality and being very light, is blown all at by the wind till it touches a moist situation when it quickly recovers.

Rose of Sharon, or Hypericum calycinum low shrub with large handsome, solitary yellow flowers, sometimes grown as a cover plant for a garden. See also SHARON.

Roseola, term applied to any rose coloured eruption but often used as a synonym for *Rubella*, or Ger measles. See under MEASLES.

Rose, Roman de la, Fr allegorical poem written in the thirteenth century. The

first part was written by Guillaume de Lorris, and the latter and more extensive part by Jean de Meung, about 1275. It is over 23,000 lines in length. The poem is an artistic and quaintly beautiful description of the love philosophy of the troubadours. The lover walks in a park belonging to Pleasure, Delight and Cupid. He is admitted by Idleness, he is driven away from the Rose by Danger and Shame and especially Jealousy, leaving the lover disconsolate. Finally he wins the Rose. The latter part is more satirical than the former. It denounces the abuse of power, argues against women and against the clergy, it denies all superstition yet still remains a beautiful romance. Its popularity in the Middle Ages was enormous, over 200 MSS. of the work have survived. Chaucer translated it into Eng. but our version is generally admitted to be by another hand. There is a modern Eng. version by I. S. Illis (Temple Classics) 1908.

Roses, Wars of the, civil wars of the fifteenth century in England when the rival houses of York and Lancaster struggled for supremacy. The name arose from the fact that the rose was selected as a badge: the adherents of York wearing white roses those of Lancaster red. The wars commenced in the reign of Henry VI. While the king was suffering from insanity (1453-54) Richard duke of York was Protector and when on his recovery the king resumed the head of affairs the Yorkist lords demanded that he should dismiss the Lancastrian lords from his council. On his refusal they at once armed and the first battle was fought at St Albans May 22 1455 resulting in a victory for the Yorkists. The king was now a prisoner. York again became Protector, but four years later he was dismissed and a battle was fought at Blore Heath, Sept 23 1459 the Yorkists under Salisbury being once more victorious. But their victory was of little use to them for when Henry VI later marched to Ludlow they were panic-stricken and fled. York (escaping to Ireland) and Salisbury and Warwick to France. At a parliament held at Coventry they were attainted and this added bitterness to the feud. In July 1460 at the battle of Northampton the king was again made prisoner. Attempts were made to bring about peace by Parliament which decided that Henry should be allowed to reign and that York should then succeed, but the Lancastrians in fact were Queen Margaret declined to accept these terms and at the battle of Wakefield, Dec 31 1460 both York and Salisbury were killed. The Lancastrians with Queen Margaret at their head, then marched S. and succeeded in defeating Warwick at the second battle of St Albans Feb 17 1461, and rescuing the king. York's son, Edward earl of March had, however, not been idle and having won the battle of Mortimer at roses, Feb 2, 1461, he joined Warwick and then marched to London, where he was proclaimed king as Edward IV, following up his proclamation by a decisive victory at Towton,

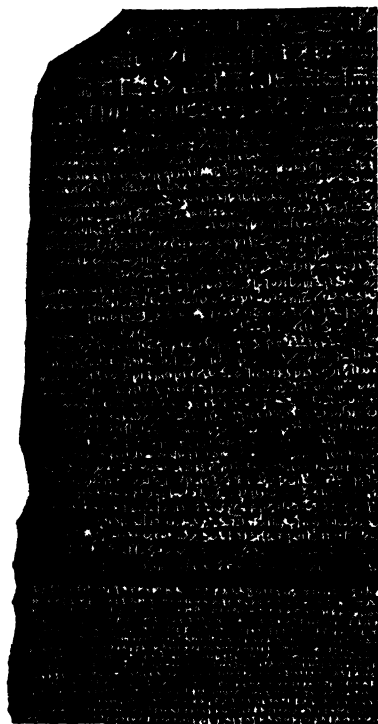
March 29 1461. Queen Margaret shortly afterwards was forced to flee to France, having been defeated by Warwick at Hedgely Moor and Hexham (April 25 and May 8 1464). At Hexham Henry VI was once more captured and placed in the tower. For the next few years peace reigned until the powerful Warwick known as the 'kingmaker' started in fighting against Edward IV and joined forces with the Lancastrians. Warwick was however, soon forced to flee to France but returned and Edward in his turn fled to Holland. In 1471 however Edward returned with an army, landed in York-shire and defeated and killed Warwick at the battle of Barnet April 14 1471 a victory which he followed up by the defeat of Queen Margaret at Tewkesbury May 4 1471 capturing the queen and killing her son Edward. For some years after peace reigned but the final struggle took place at the battle of Bosworth Field Aug 22 1485 which gave the crown to Henry VII and established the throne on a firm foundation, his marriage with Elizabeth of York cementing the peace between the two parties. The wars were not fought on principles, but were founded on personal quarrels; the mass of the people were probably indifferent to the struggles which seem to have affected England extraordinarily little. The period they covered marks the beginning of the Eng. Renaissance, the flowering of Perpendicular architecture and the growth of the merchant class. But during the wars the old nobility was almost wiped out a larger class of property owners with smaller fortunes replaced the great magnates a sure basis on which Tudor despotism could be founded. See J. H. Ramsay, *Lancaster and York, 1492*, J. D. Thorns, *England under the Yorkists, 1420*, and J. H. Fleming *England under the Lancastrians, 1421*.

Rosetta (Arabic *Rushid*) decayed Muslim city on the Rosetta branch of the Nile in Egypt. The famous 'Rosetta Stone' (*q.v.*), which led to the deciphering of Egyptian hieroglyphs was found near here in 1799 by Bousnard. Pop. 26,000.

Rosetta Stone, inscribed slab of black basalt which provided the key for the decipherment of hieroglyphic (*q.v.*) writing. It was discovered in Aug 1799, in the fort of Saint Julien de Rosetta near the Rosetta mouth of the Nile (a few miles from Alexandria) by a Fr. artillery officer (Capt M. Bousnard). He reported the find to his superior Gen. Menou, who immediately realised the importance of the monument and had it taken to his home. When Napoleon heard of the discovery he ordered that it be deposited for study at the Fr. Institute in Cairo. On the capitulation of Egypt to the Brit., the R. S., shipped in 1801 to England, passed into the Brit. Museum (where it is now deposited B.M. 960 No. 24), and came by good fortune under the charge of Sir Wm. Hamilton, whose interest in Egyptian antiquities was keen. The R. S. is a mutilated block, about 3 ft. long, 2 ft. wide, and 1 ft. thick. It is

covered on its one flat surface with inscriptions in three different scripts

It was immediately inferred that these inscriptions were but different forms of the same text. The upper version (fourteen lines) was given in Egyptian language and in hieroglyphic writing; the second text (thirty-two lines) also in Egyptian, was written in demotic (*q v*) writing, and the



British Museum

ROSETTA STONE
(Upper left hand corner)

In the reproduction can be seen a part of the corresponding inscriptions in hieroglyphics, demotic and Greek

last (fifty-four lines) was written in Greek language and script. This last text was readily interpreted, and the monument proved to be a decree, drawn up on the 18th meshir (March 27) 196 B.C. by the priests of Memphis in honour of Ptolemy (V) Epiphanes (204-181 B.C.). Starting from the known, the hieroglyphic and demotic writings were slowly made to yield their secrets. The hieroglyphic text contains oblong rings, known as 'cartouches,' and already in 1797 the Danish scholar G. Zoega had recognised that such 'cartouches' contain royal names. Comparing the hieroglyphic text with the Greek

version the Cambridge scholar Dr Thomas Young (1773-1829) succeeded in the decipherment of a few letters in the name Ptolemy (Gk Ptolmāis). The first Egyptologist Jean François Champollion (1790-1832) recalled an obelisk with a bilingual inscription he had seen on the river of Phibes in the Nile, containing similar cartouches and, in its Greek version, the names Cleopatra and Cleopatra (Ptolmāis Kleopatra). Champollion recognised how similar were the cartouches of the obelisk and on the Rosetta, and that the cartouches of the obelisk containing two different names had some of the same symbols for instance what is now known as 'I'. Champollion thus found the values of thirteen characters. Next he identified (on other monuments) the name Alexander which supplied three more signs. Step by step he went through all the proper names he could find and at last he could read whole sentences. In 1822 Champollion announced the results of his studies to the Académie des Inscriptions et Belles-Lettres. In this masterly dissertation and in his subsequent researches he laid the foundation of the modern science of Egyptology.

Rose-water, water scented with the distilled essence of roses. In the East it is sprinkled over the hands after eating and the custom is occasionally followed in Europe. See **Rose-dishes** for this purpose. Exist in England including one presented by Samuel Pepys to the 'Cloth workers' Company.

Rose-water Ointment, see **COLD CREAM**.
Rose Window, in Gothic architecture, circular window frequently placed over one of the large doors. It is usually filled with elaborate tracery.

Rosewood, wood of various trees, so called on account either of a rose-like fragrance or a rose colour. The best fragrant Rosewood is often called Palisander wood. It is derived from *Dalbergia nigra*, a native of Brazil whence it is exported in large heavy slabs. The wood is chiefly used in veneer and cabinet work.

Rosh ha-Shanah (Heb. Head of the Year New Year) is a main Jewish festival, celebrated on the first two days of the seventh month (*Tishri*) which was the beginning of the civil year in ancient Israel. Like *Lôl* Kippur or *Lôl* ha-Kippurim (*q v*) and unlike all the other Jewish festivals communion with God is sought not through joy but through solemnity. Rosh ha-Shanah being an occasion for solemn introspection and meditation over the year that has gone.

Rosicrucians, members of semi-secret, or secret fraternities who practised a system of mystical philosophy, intended to guide the expansion of inner perception. These societies first became widely known to the public in the seventeenth century through a series of publications the earlier of which have been attributed to John Valentine Andreæ, a Lutheran minister, who died in 1654. It seems clear that the movement had a much more ancient existence than this, one of these pamphlets, issued in 1607, contained references to Rosicrucianism in 1410. The name is

said to originate from the symbol comprising the cross with a single red rose in its centre, but another seventeenth century pamphlet ascribes the foundation and naming of Rosicrucianism to Christian Rosenkreuz a Ger nobleman of the fourteenth century, who gained his knowledge by long travel in the E. Early R practised alchemy extensively, and claimed magical and hypnotic power, but later societies bearing the name can have had little or no connection with the original ones. See H Jennings, *The Rosicrucians, their Rites and Mysteries* 1870 1887 and A E Waite *The Real History of the Rosicrucians* 1887.

Roskilde, see ROSKILDE.

Roslavl, tn of the Smolensk Region of the R S F S R, 70 m S E of Smolensk in flax and hemp also grown in the dist. and there is trade in tobacco grain, and fat. Pop 28 000.

Roslin, or **Rosslyn**, vil on the N Esk, 7 m S of Edinburgh in Midlothian Scotland. It was made a burgh in 1456 but later became unimportant. There are remains of the fourteenth century castle of the Sinclair's which the Eng razed in 1544, but the chief glory of the vil is the chapel, described in Scott's *Tay of the Last Minstrel*. Its proportions are small (70 ft x 33 ft x 42 ft), but the delicate and beautiful carving on the

Prentice pillar on the clustered columns pinnacles and vaulted roof are outstanding. R gives the title of earl to the family of St Clair Erskine. Pop 2000.

Rosmead, **Heracles George Robert Robinson**, Baron, see ROBINSON.

Rosmer, **Milton** (b 1881) Brit actor, b in Southport, and educated at Manchester Grammar School. He made his first stage appearance in 1899, and from 1910 to 1915 was a leading member of Miss Hornmann's company at Manchester. His London successes include performances in *St Joan* (1921) and *Gas Light* (1939). R's fine character acting has made him equally at home in Shakespearean and modern drama. His interpretation of Cassius in *Julius Caesar* is especially noteworthy.

Rosmini-Serbati, **Antonio** (1787-1855) It philosopher and theologian b in Rovereto and ordained priest in 1821. He founded in 1828 a religious congregation known as the Institute of Charity. To comply with the wishes of Leo XII, and encouraged by successive popes he undertook the reform of philosophy, but his works thereon provoked much opposition. Two of his books *The Five Wounds of Christ* and *The Institution of Social Justice*, were placed on the Index, mainly on account of certain views in connection with the election of bishops. In 1888, after the death of R S forty propositions taken mainly from posthumous works, unreviewed by the author, were condemned. R S was a man of saintly life and his institute has flourished. It has a college near Leicester in England. For an appreciation of his philosophy see T. Davidson, *The Philosophical System of Antonio Rosmini Serbati*, 1882.

Rosette Acid ($C_{20}H_{10}O_2$), coloured organic

compound formed from the rosaniline base by treating it with nitrous acid and heating, the product *trihydroxytolylidiphenyl carbinol* is unstable and loses one molecule of water to form R A. In commerce it is prepared by heating phenol with oxalic acid and sulphuric acid. R A possesses a beautiful red colour, but is not much used in dyeing, as it is difficult to fix. It is employed as an indicator for acids and alkalis, as acids decolorise it.

Ross, Betsy (1752-1836) semi-legendary figure in the early hist of the U S A b in Philadelphia. She is said to have made a Stars and Stripes flag from a pencil sketch by Washington as early as June 1776, but she changed the points of the stars from six to five. Historians doubt the story's accuracy.

Ross, Sir Edward Denison (1871-1940), Brit orientalist, educated at Marlborough School and Univ College, London, and studied oriental languages in Paris and Strasbourg. In 1906 he was curator of records for the gov of India. From 1914 to 1917 he was assistant in the Art of the E section of the prints and drawing dept of the Brit Museum. In 1917 he was appointed the first director of the School of Oriental Studies (see ORIENTAL AND AFRICAN STUDIES SCHOOL OF) and, at the same time, prof of Persian in the Univ of London holding both offices until his retirement in 1937. Among his varied publs were *The Heart of Asia* (with F H Skrine), a popular account of Persian art, trans of an Arabic hist of Gujarat, a polyglot list of birds in furki (Hindic), and *Manchu and the English Language* (1939).

Ross, Sir James Clark (1800-62) Brit sailor and explorer b in London. He made along with five voyages in search of the N W passage and accompanied Parry in his effort to reach the N Pole (1827). Whilst with his uncle Capt John R. he discovered the N magnetic pole (1831). In his *Voyage of Discovery and Research to S and Antarctic Regions* (1847) he gives the results of his own experiences in the *Erebus* (1839-43). He was knighted in 1843. He named Mt Erebus and Victoria Land.

Ross, Sir John (1777-1856) Brit sailor b at Inch Wigtonshire. He made two important voyages of polar exploration, the results of which he narrated in his *Voyage of Discovery for the Purpose of Exploring Baffin's Bay* (1819) and *Second Voyage in Search of a N W Passage, including the Discovery of the North Magnetic Pole* (1833). For the first (1818) he was fitted out by gov., and for the second (1829-33) by private enterprise. During the latter he was for the most part ice-bound and suffered severe privations. Consul at Stockholm from 1839 until 1845, he led an expedition in search of Franklin in 1850.

Ross, Martin (1862-1915), pseudonym of Violet Florence Martine, Irish novelist, b in Galway and educated at Alexandra College, Dublin. With her cousin, Edith Cénoue Somerville (q.v.), she collaborated in a number of novels.

Ross, Sir Ronald (1867-1932), Brit.

physician and poet b at Almora, India, and educated at St Rutholomew's Hospital, London. He entered the Indian Medical Service in 1881. He discovered the life hist of malaria parasites in mosquitoes (1897-98) though Lamin had already done much work on this subject. R thereby confirmed the theory which had been formulated by Sir Patrick Manson (q.v.) in 1894. For his work he received the Nobel prize in 1902. R led an expedition to malarial W. Africa in 1899. He was knighted in 1911. R was also a distinguished poet, and his poems include *The Prevention of Malaria* (1910) *Memoirs* (1923) and *Studies on Malaria* (1928), also poems and one novel. See life by R. L. McGroz, 1931.

Ross, Sir (William) David (b 1877). Brit scholar b at Dunrobin Castle and educated at the Royal High School Edinburgh, Edinburgh Univ, and Balliol College, Oxford. He became prof of moral philosophy at Oxford in 1923. From 1922 until 1947 he was provost of Oriel, and was vice-chancellor of Oxford Univ from 1941 until 1944. His translations of Aristotle's works are now standard texts, and he has written many works on philosophy. He was chairman of the royal commission on the press (1947). R was knighted in 1948.

Ross, Earldom of, Earldom created in 1225 by Alexander II, king of Scotland. Both he and his descendants were prominent in the public life of their times. The third earl Hugh was killed in 1333 at the battle of Halidon Hill where, as was the custom of the earls of R, in battle the shirt of St Ruthan. His granddaughter, Euphonia, succeeded her father Earl William in 1372. She married Sir Walter Leslie of Aberdeen, a distinguished soldier, and on her death (c. 1395) the title passed to her son, Sir Alexander Leslie. He died in 1402 and his daughter, Euphonia, died without issue (c. 1415). Thereupon her aunt Mary, wife of Donald MacDonald, Lord of the Isles, succeeded. The earldom remained with the MacDonalds until 1478. In that year the thirteenth earl, John, having been convicted of treason and having made his submission in Parliament, was created a peer of Parliament as Lord of the Isles. The earldom of R, however, was not restored. It was annexed by the crown not again to be granted to any but the only or second legitimate son of the Scottish king.

Rossall School, Eng. public school for boys at Rossall, Lancashire, 3 m S of Fleetwood, founded in 1844. It was incorporated by royal charter in 1890 and is governed by a council. There is a junior dept and the school has accommodation for 550 pupils. The chapel contains a carved reredos by Eric Gill.

Ross and Cromarty, originally separate were united in 1891 and form a N. Highland co. of Scotland. The co. includes the is. of Lewis (except the S. part called Harris) and many small is., mostly uninhabited. It is bound to the N. by Sutherland and the Dornoch Firth and in the S. by Inverness shire and the Beaulieu Firth.

The coast line is long and much indented. On the L. coast are the Beaulieu and Inner Moray, and Cromarty Firths (which together nearly encircle the Black Isle) and Dornoch Firth. The climate is varied, being moist and mild in the W. bracing and dry in the E. and cold in the uplands. Only about 7 per cent of the whole surface is arable, mostly along the S. seaboard and in the Black Isle, a considerable part is over 1000 ft with many peaks exceeding 3000 ft. Best known peaks are Ben Wyvis in the N. E. (3429 ft.) and along the watershed Sgurr Mor (3657 ft.) Ben Dearg (3517 ft.) Sgurr na Lapulch (3773 ft.) Mam Soul (3862 ft.) Ben Attow (3343 ft.) Ben Eite (3477 ft.) Ben Mohr (3570 ft.) by Loch Maree is Ben Shoch (3217 ft.) and at the head of Loch Duich the stately Five Sisters of Kintail. In Lewis the surface is featureless and mostly morland. The watershed of the mainland runs roughly N. to S. and is in the W. half rising slowly. The longest of the prin. are the Oykel and Carron to Dornoch Firth and the Conon with its tails to the Cromarty Firth, flowing W. to the Shiel Loch and Carron. The Ben Ben. Many beautiful waterfalls include the Mahe (50 ft.) the highest in Great Britain. Fresh water lochs are numerous the largest Loch Maree 13 km long is very beautiful. The chief industries are agriculture with afforestation, fishing, Harris tweed manufacture, whisky distilling. Some of the richest agricultural land in Scotland is in Lewis Ross and Black Isle, and these are noted for breeding of pedigree Shorthorn cattle. Oats and barley are the prin. grain crops, and there is a large crofting pop. Since the Second World War much of what was deer forest land is now devoted to cattle and sheep grazing. The considerable timber area, denuded by two wars, is being gradually replanted and there are hydroelectric schemes. Fisheries along both coasts are extensive, principally herring and white fish, with salmon from the rivers and estuaries. Chief fishing ports are Stormway in Lewis, Cromarty, Ullapool and Gairloch. Dingwall (pop. 3200) co. town and royal burgh, is important as a live stock centre. Stormway (100) the largest town is the centre of the Harris tweed industry with six mills. Town with three medieval churches (one still used), and Fortrose with a ruined cathedral, are royal burghs. Invergord and Cromarty are seaports and S. end offer a mineral spa and holiday resort. Hugh Miller, geologist, Sir Thomas Cluquhart, translator of Rablans, Sir Alexander Mackenzie, discoverer of the Mackenzie R., Gen. Sir Hector Macdonald who rose from the ranks, were natives of Ross-shire. Clan feuds apart, battles of national importance were Longside, 1481, Invercarion, 1650, at Glen-shiel, 1719. The is. of Lewis provides one of the most striking monuments in Britain in the standing stones of Callernish (q.v.) (megolithic period), and in the Brooch of Carloway, an excellently preserved specimen of an inhabited tower of the Pictish period. Knockfarrel, near Dingwall, is an anct.

vitrified hill fort, good examples of castled ruins are Lochsain and Ballone Castles. There are a number of pagan and early Christian Pictish sculptured stones in the co. of which the Nigg Stone is probably the finest example of early Pictish art in existence. The mainland is a parl. constituency returning one member, Lewis is part of the W. Isles constituency. The railway runs along the E. coast of the mainland, with branches to Fortrose in Black Isle and to Kyle of Lochalsh to connect with the steamer service to Stornoway. There is a daily return air service from Inverness to Stornoway. Pop. (estimated 1949) 62,000 of whom 90 per cent in Lewis and 25 per cent on the mainland are bilingual in Gaelic and Eng. Area 3089 sq. m. See R. Bain, *History of the Ancient Province of Ross* 1899. N. Macrae *The Romance of a Royal Burgh Dingwall's Story of a Thousand Years* 1923. W. J. Watson *Loss and Cromarty* (Cambridge County Geography Series) 1924. W. Macdonald and Pol on *The Book of Ross Sutherland and Caithness* 1948.

Rossano, city of S. Italy in the prov. of Cosenza, once the Rom. fortress of Roscanum. 24 m. N.N.E. of Cosenza. It has a Byzantine cathedral and a library with valuable MSS. of the Gospels. Near by are marble quarries. Pop. 19,600.

Roszbach, vil. in the former prov. of Prussian Saxony in the dist. and 8 m. S.W. of the tn. of Merseburg. Here the Fr. and Austrians were defeated by Frederick the Great in 1717.

Rosberg, 1. Mt. (5174 ft. high) on the borders of the cantons of Zug and Schwyz, N.N.E. Switzerland. 2. In with lead and coal mines, 4 m. N.E. of Puthen (Bytom) in Silesia, Poland. Pop. 20,000.

Ross Dependency, terr. on the coasts of the Ross Sea in Antarctica which were proclaimed a Brit. settlement in 1923 under the control of the governor general of New Zealand. It is an important whaling centre.

Rosse, William Parsons third Earl of (1800-67). Brit. astronomer. b. at York and educated at Trinity College, Dublin and Magdalen College, Oxford. He represented Kings co. in Parliament from 1821 until 1834, presided over the Royal Society from 1848 until 1851 and in 1862 was appointed vice-chancellor of his own univ. of Dublin. In 1845 he constructed a giant telescope 76 ft. long with 6 ft. speculum, the largest that had ever been previously made. After 1848 it was used for many years specially for the observation of nebulae.

Rousseau, small tn. and lake port of Ontario, Canada, in Muskoka co. It is situated at the N. end of Lake R. which latter communicates in the S. with Lake Muskoka about 60 m. N.N.E. of Collingwood.

Rossello, Maria-Josepha (1811-88), b. at Albisola near Savona, Italy. In 1837 she became the foundress of an Institute of nuns, called the Daughters of Our Lady of Mercy, which rapidly spread through Italy and S. America. Canonised in 1949.

Rossetti, Christina Georgina (1830-94). Brit. poet. Sister of Dante Gabriel and Wm. Michael R. (q.v.) b. in London. Even as a child she wrote verses and her first recorded poem was completed at the age of twelve. In 1847 a vol. of her verses was privately printed and in 1850, over the signature of 'Ellen Allayne,' she contributed to the famous but short-lived periodical the *Germ*. In 1862 she pub. her best work *Goblin Market and Other Poems*. *Goblin Market* is the high-water mark of Christina R., and shows such originality and imagination as she in no other work gave proof of. In this and other vols. she printed many exquisite lyrical pieces. The touch of sadness that pervades her writing may have been partly due to an unhappy love affair in her youth and during her life she suffered constantly from ill health and a succession of family bereavements. She possessed a sensitive appreciation of natural beauty and her poetry has a unique simplicity and purity of tone. Christina R. ranks with Donne, Crashaw and Vaughan as one of England's great mystical poets and is, with Newman and Keble, one of the poets of the early Oxford movement. Though the theme of her poems is often sad, the poems are never morbid or utterly gloomy and her devotional poetry expresses an ultimate hope and realities. Critics have awarded her some of the insight of Shakespeare and fancifulness of Coleridge. Among her other books are *Prince's Progress* (1866), *Inus Demum* (1871) and *Pageant* (1884). A complete ed. of her works was issued with a memoir by her brother Wm. R. in 1904 and her letters in 1908. See lives by M. J. Sandars 1930 and D. M. Stuart 1931.

Rossetti, Dante Gabriel (1828-92). Brit. painter and poet. b. in London, son of Gabriele R., a Neapolitan refugee and brother of Christina and Wm. Michael R. (q.v.). He was prof. of it at King's College and educated at the school attached to the college. Like his sister Christina he exhibited a precocious taste for letters and in 1840 composed a ballad, *Sir Hugh the Heron* (privately printed, 1843). He studied drawing under John Sell Cotman and afterwards worked under Cary and at the Royal Academy schools. At this time however his literature was more attractive to him than art. He trans. Dante, beginning his labours in 1845 and two years later wrote *The Blessed Damozel* and sev. of his best sonnets. *The Blessed Damozel* and his prose story, *Hand and Soul* appeared in the *Germ* (1850) which was ed. by his brother Wm. He had already sought instruction in art from Ford Madox Brown to whose influence he owed much, and he came into intimate relation with the Pre-Raphaelites (q.v.). Holman Hunt (with whom at one time he shared a studio) and Millais. He continued to work at literature and art but he made little impression on the public. Ruskin, however, had the knowledge and intelligence to appreciate R.'s work and his influence did much to establish R.'s reputation. Between 1850

and 1860 he produced many of his best pictures including 'Mary Magdalene' and 'Paolo and Francesca'. In 1860 he married Elizabeth Siddal who had sat to him for his *Beatrice* but she died within two years. In his grief he buried his wife's poems in her coffin but yielding to the entreaties of friends he sanctioned their dissemination in 1869, and these and others were pub. in 1870. Unfortunately, after this he became addicted to the use of chloral which affected both his bodily and mental health though he continued to paint many wonderful works including 'Venus Astarte' (1877). He attempted suicide in 1872 and suffered from partial paralysis from 1881. He was a great artist both with the pen and the brush and it is often disputed whether he is greater as a poet or a painter. It is said that he never mastered some of the technicalities of art but his imagination and his colouring lend a charm to his pictures that make them rank very high while the music and symbolical qualities of his verse places him among the great poets of the nineteenth century. His mysticism gives him an affinity with Wm. Blake. His poetical works were collected in 1886 and his letters with a notice by his brother Wm. were pub. in 1891. See lives by J. G. Stephens 1894, J. C. Benson 1901, J. Waugh 1928, J. C. Trowell 1930, V. Hunt 1936, Helen Rossetti Angell 1945, O. Doughty 1941. See also W. Gaunt *The Pre-Raphaelite Revival* 1912 and K. Preston *Blake and Rossetti* 1944.

Rossetti, William Michael (1829-1919). Brit. author and art critic, brother of Christina and Dante Gabriel R. (q.v.) b. in London and educated at King's College. He obtained a post in the inland revenue dept. but devoted his leisure to art and literature. He married Emma Lucy, a daughter of Lord Madox Brown, one of the Pre-Raphaelite Brotherhood of which literary and artistic circle he became a member. For a short time he was editor of the *Germ* which was founded in 1850 as the official organ of the brotherhood and himself wrote the sonnet printed on the cover. He was probably the very last surviving close friend of Ruskin. R. is largely responsible for bringing about in England a true appreciation of the oriental especially Jap. as opposed to the Caucasian faculty in fine art. His best known poems were 'Venus in blank verse of Dante's *Hell*' (*1st of Keats* (1887)) *Memoir of Dante Gabriel Rossetti* (1891) *Reminiscences* (1906) and *Lines of Famous Poets* (1878).

Rossi, Francesco dei, see SALVATI

Rossi, Giovanni Battista (1136-1441). It. painter b. at Florence. He formed his style on that of Michelangelo and superintended the artistic decoration of the palace of Fontainebleau for his patron Francis I.

Rossi, Count, Pellegrino Luigi Edoardo (1787-1818). It. economist and statesman, b. at Carrara, and educated at Pavia and Bologna. He sought safety in Geneva after the fall of Murat, whom he had supported. Disappointed that his revised constitution, known as the 'Pacte Rossi,

was abandoned by the Swiss, he accepted in 1813 the chair of political economy at the Collège de France. He became Fr. ambas. at Rome and on the outbreak of revolution in 1848 he attached himself to Pope Pius IX. but was murdered by the Republican party.

Rossini, Gioachino Antonio (1792-1868). It. operatic composer b. at Pesaro and studied under Mattei at Bologna. In 1810 he produced his first work, a comic opera *La Cambiale di Matrimonio*, in Venice. This was an immediate success. Of the thirty stage works he wrote during the following fifteen years the chief were *Lancredo* (1813), *Il barbiere di Siviglia* (called *Almaviva* & failed when first given in Rome (1816) *Orelli* (1816) *Gazza Ladra* (1817) *Mosè in Egitto* (1818) and *Semiramide* (1823). In 1823 he visited England. In Paris he wrote *Guillaume Tell* (1824) considered by many to be his finest work. His remaining compositions included the *Stabat Mater* (1832-40) and *Messa Solenne* (1864). R.'s music shows vigour, vitality and true technical sensuousness; the finest of it has spontaneity and charm and his handling of voices and orchestra alike are distinct for glitt. ring effects, it is for his occasional musical vulgarity. See lives by L. Dufray 1905, A. de Curz 1910, I. Love 1931 and R. Buchich 1941.

Ross-shire, *see* **ROSS**. Wexford. It. 7 m. S.E. of Wexford. It extends along the coast one part putting out on a narrow peninsula and forming the S. boundary of Wexford Harbour. It was settled by King John in 1210. Pop. 100.

Ross-lau, in S. of Germany, in Anhalt on the Elbe 3 m. S. of Dessau. The main manufacture paper machinery wire goods chemicals etc. Pop. 12,000.

Rosslyn, *see* **ROSSIN**.

Rosslyn, Earl of, *see* **WEDDEBURN ALEXANDER**.

Ross on Wye, mkt. tn. and urb. dist. of Herefordshire, England, on the R. Wye 12 m. S.E. of Hereford. It has many associations with John Kyrie (d. 1724) described by Pope as the 'Man of R'. The church of St. Mary the Virgin is a fine Decorated and Perpendicular building. There are flour mills and agricultural implements and boot factories. Pop. 5,200.

Ross Sea, part of the Antarctic Ocean S. of New Zealand lying between S. Victoria Land and King Edward VII. Land. It is free of ice in the summer and was therefore used as a way of approach to the S. Pole by both Amundsen and Scott.

Ross-shire Buffs, *see* **SILFORTH HIGH LANDERS**.

Rostand, Edmond (1858-1918). Fr. dramatist and poet b. at Marseilles. His farcical *Les Romanesques* (1894) was followed in 1895 by *Le Prince de Montélimar* in which Sarah Bernhardt interpreted the character of Mélissande, she also played Photine in his biblical play *La Samaritaine* (1897), and of the duke of Reichstadt in *L'Anglais* (1900). In this tragedy the pathos of the life of surveillance and misunderstanding which

Napoleon's son was condemned to lead is beautifully expressed. The heroic drama *Cyrano de Bergerac* (1897) in which Coquelin created the title role was an outstanding success in 1910 this was followed by the farward fantasy of *Chantecler* the production of which was a triumph of magnificent and artistic effects. *Les Musardes* (1911) was in the main a reissue of his early poems. R's versatility is shown by the variety of his dramatic productions but his best work was that done in the romantic tradition where fine prose, skilful characterisation and a vivid insight into human emotions particularly of the frustrated combined to produce masterpieces. In 1912 R pub his *Printemps de l'été* *De l'été* by G. Harnett 1913 P. Apostolov, 1929 and R. Cruid 1935.

Rostock, seaport on the estuary of the Warnow 8 m from Warnemünde on the Baltic in Mecklenburg, Germany. Once a Roman P. possessed a fourteenth-century gate and Gothic hall and five alt churches. The only the oldest in Germany was founded in 1418. Ship-building is the chief industry. Blücher was born in R. In 1942 R was one of the chief bases of supply for the Russian front and the home of the Heinkel aircraft works and various chemical industries. It was therefore bombed heavily by the RAF. Many of R's oldest buildings were destroyed. R was captured by Kokosovskiy 5000 White Russian Army in May 1919. Pop. 122,400, including Warnemünde (93,000).

Rostov, tn of the Rostov Region of the RSFSR 35 m S.W. of Yaroslavl. It was founded in the ninth century, and its historic buildings include the Uspenski Cathedral and the Kremlin. Since 1917 it has become an industrial centre, with linen and cotton mills, flour mills and coffee and chicory manuf. Pop. 23,400.

Rostov-on-Don, tn in the Rostov Region of the RSFSR on the Don 25 m from its mouth. It is the gateway to the Caucasus and local point of communication between Moscow, Stalin, and the Volga and the Ukraine, on the one hand and the Caucasus on the other, besides being the great river port of the Don having access by the Don to the Black Sea. Its importance will be further enhanced when the Mynch-Kuma and Don Volga canals are completed. The significance of R's geographical position is reflected in its hist. After the laying waste of the ant. Gk colony of Tanais near the modern tn of Azov by the Huns the region between the lower Don and the sea of Azov remained largely uninhabited until the arrival of Russian settlers in the eighteenth century. In 1761 a fortress was built on the high l b of the Don, named after St. Dmitri of Rostov (the seat of the ant. principality near Moscow) and later named R. on D. in order to distinguish it from the older tn. Before 1917 R was the headquarters of the Don Cossack military organisation and the seat of a bishop.

After the revolution R was rapidly industrialised, and before the Second

World War possessed one of the largest agric. engineering works in Europe, being favourably situated near the region which contained not only the largest coal mining industry in Russia (the Donbas) but also some of the largest steel and chemical works besides being within convenient distance of the Caucasian oil wells. The city changed hands four times during the Second World War. Many of its public buildings and most of its industries were destroyed by the Gers when they were driven out in Feb. 1943 after their rout at Stalingrad. There is an important market gardening region around the city. R is one of the chief centres of such industries as flour milling, distilling, vegetable oil production, fruit canning, tobacco manuf. and the production of champagne and wines. An oil pipe line runs to R and beyond to Nikitova. This line is being continued to the Dniepropetrovsk industrial region. The port is busily engaged with trade during the nine months of the year when it is free from ice. Grain and wool are the chief exports.

R was captured by the Gers under von Kleist in the late autumn of 1941, being retaken by M. I. Timoshenko a week later. It was Hitler's first major reverse but it handed hands for the third time when the Gers recaptured it in July 1942 and finally when Gen. Malinovsky liberated it in Feb. 1943. R is his rail from the Don to Budapest. Pop. 10,300. See further under EASTERN FRONT OF RUSSO-GERMAN CAMPAIGN IN SECOND WORLD WAR.

Rostovzev, Mikhail (b. 1870) Russian scholar b. at Kiev. He held the chair of ant. hist. at St. Petersburg from 1901 to 1915. From 1920 until 1932 he was prof. at the Univ. of Wisconsin, U.S.A. Since 1932 he has held the chair of ant. hist. at York. His research work on the Roman Empire etc. has greatly influenced modern opinion on the subject. His publs. include the monumental *Social and Economic History of the Roman Empire* (1928) and *Economic and Social History of the Hellenistic World* (1931).

Rostro, famous platform of the ant. Rns from which public speakers used to address the people. It stood between the forum and comitium and was so called because it was adorned with paws of captured galleys. In modern Eng. the singular form *rostrum* is used only.

Roswitha, or **Roswitha**, see **ROSWITHA**.
Rosyth, naval base on the frith of Forth in Fife-shire, Scotland, is on the N. of the shire at St. Margaret's Hope. Started in 1903 it was nearing completion at the outbreak of the First World War and soon became important as a repairing base and headquarters of the cruiser squadrons. It was reduced to a maintenance base in 1925 but reopened in 1939 on the outbreak of war and was the main port of assembly for the Norwegian expedition of May 1940. R. Castle is a ruin, 2 m to the W. of Inverkeithing. Here lived Queen Margaret, wife of Malcolm Canmore. In St. Andrew's Church in 1946 was dedicated a boat-shaped pulpit given

by R. Destroyer Command. In memory of the men of the 'little ships'.

Rotary, see ROUND

Rotary International, organisation aiming at establishing the principle of service international peace, and good fellowship as the foundation of all business transactions. It consists of clubs which are composed of representatives—business and professional men—selected on a classification basis. The first club was started in 1905 by Paul P. Harris (*d* 1917), a Chicago lawyer. The name Rotary is derived from the early practice of holding meetings in rotation at the houses of the various members. The New York Rotary Club was founded in 1909 and there are now (1950) 1061 clubs in the U.S.A. and 248 in Canada. Outside America the first Rotary Club to be formed was in Dublin in 1911 and in 1911 the Brit. Association of Rotary Clubs was established. In 1922 this association became known as R.I. Association for Great Britain and Ireland, the title R.I. being adopted for the organisation by all clubs in that year. In 1938 the Brit. and Irish Association changed its title to the R.I. in Great Britain and Ireland. In Great Britain and Ireland there are now (1950) 668 clubs, while the total number of clubs in the world is 6916 in over eighty countries with a total world membership of 350,000. The Rotary motto is 'Service above self'.

Rotation. A line is said to rotate when one point is fixed and the other points describe circles round it in the same plane or in parallel planes all maintaining the same relative positions. A plane may rotate about any point or line within it or on its boundary. A solid rotates when its parallel planes rotate round a series of fixed points within it forming a straight line. This series is the axis of rotation. The planets and other celestial bodies have their axes spinning about their axes. All particles not in the axis move in circles. Velocity of each particle is the product of its angular velocity measured in radians per sec., and its distance from the axis. Angular velocity is geometrically represented by a vector drawn along the axis of rotation, and of length equal to this speed. R. is thus change of direction of a vector. **See QUATERNIONS, VECTORS**

Rotation of Crops, system of growing crops in some particular order with the objects of utilising fully the plant foods in the upper and lower part of the soil, of checking insect and fungus pests by depriving them for a period of their essential food of distributing labour economically, and of providing a variety of food for cattle and other live stock. The most primitive R. is that of cropping the land annually with a cereal until it ceases to be profitable, and then allowing it to revert to weeds which ultimately form a rough pasture until in course of time the land has regained a certain amount of fertility. This wasteful system still prevails to some extent in the newer countries, where the virgin soil is exploited until it ceases to be productive and then allowed to revert to prairie. A great advance on this was the medieval

system of dividing the tillage area between a winter cereal (wheat or rye), a spring cereal (barley or oats) and bare fallow or beans. Various modifications were made with the introduction of new crops until in the first half of the eighteenth century the following famous Norfolk or four course R. was evolved. In the first year in autumn sown cereal—wheat in the second year roots—turnips, mangolds, potatoes, cabbage etc. third year spring sown cereal—barley or oats, fourth year leguminous crop—clover, peas or beans. Modifications of this and five, six and eight crop Rs. have come into use in particular lists on special types of soil but the general principle remains. **See also under CROPS, LAY FARMING.**

Rotche, or Little Auk species of Alcid (*q.v.*) known technically as *Meptis alpestris*. During the winter it frequently migrates to Great Britain and it breeds times it is often seen in great numbers in Greenland. Its length is about 8½ in. its bill is short broad and black the plumage is greyish black above white below and there is a small white spot above the eye.

Roter, or **Roten Turm**, 155 in the Franconian Alps 17 m. S. of Sibiu. It takes its name from the square red tower, built in 1533 at the S. end.

Roth, Stephan Ludwig 1796-1849. Ger. writer and educational reformer b. at Medinich. He was an enthusiastic follower of Pestalozzi and attempted to put his ideas into practice. **See A Maly Sovetskoye Izdaniye Roth, 1937.**

Rothensted Park, estate 1 m. N.W. of St. Albans noted for the scientific experiments in agriculture which were carried on by Sir John Bennet Lawes (*d* 1900) and which owing to his munificent endowment of £100,000 are still being carried on under the Lawes Agricultural Trust. The station now receives gov. assistance and is one of the chief centres of agricultural research in the world.

Rothe, Richard (1739-1867) Ger. Protestant theologian b. at Posen and successively member, prof. director and *ephorus* of the Theological Seminary of Wittenberg. In 1817 he was nominated prof. of theology at the Univ. of Heidelberg. Vigorous grasp and independence of thought were his chief characteristics. His prin. production is the *Theologische Ethik* (3 vols. 1841-48 and ed. 2 vols. 1867-71) a complete system of speculative theology or philosophy. **See study by J. Happel 1909.**

Rothenburg ob der Tauber, tn. of Bavaria Germany 1 m. W.N.W. of Ansbach, it stands high above the R. Tauber. It is a historical town with numerous medieval buildings and fortifications in good condition. There are many of baby carriages, (christening) decorations, and so on products. R. became independent in the fifteenth century and was incorporated into Bavaria in 1802. R. is often referred to as the 'Franconian Jerusalem'. Pop. 9000. (**See illustration, p. 242.**)

Rothenstein, John Knewstubb Maurice (b. 1901), Brit. art director and writer,

b in London and educated at Bedales School and Worcester College, Oxford where he read modern hist. and London Univ. He was prof. of art hist. at the Univ. of Kentucky and Pittsburgh but returned to England to become director of the City Art Gallery in Leeds and of the City Art Galleries and Ruskin Museum in Sheffield. In 1938 he became director of the Fitz Gallery showing enterprise and imagination in this post. His pub. on Eng. and Ir. painting include *The Life and Death of Corder* (1938) and *Augustus John* (1943).

Modern Art and in the Metropolitan Museum of New York. His Jews mourn- ing in the Synagogue included in his series of Jewish pictures which began with *The Palmud School* is in the Tate Gallery which also has his *The Dolls House*. His visit to India to study the Durbar had a marked influence on his painting increasing his sense of light and colour and in 1910 he took an active part in the formation of the India Society to promote an appreciation of Indian art and letters. See collections of his litho- graphic portraits were pub. between 1897



D. M. Leish

THE PIONEER ROTHERHAM OF OLD TAUBIR

Rothenstein Sir William (1872-1945) Brit. artist b. at Bradford and educated at Bradford Grammar Sch. He trained at the Slade School and in Paris at Julien's under Lefebvre and Constant but it was Degas and Whistler who really discerned the quality of his gifts. At nineteen he began a series of portrait drawings including numerous persons famous in literature such as Tennyson, Swinburne and Hardy. After 1900 his art was marked by an increasing seriousness and depth in place of the almost facile brilliance of its beginnings. In the First World War he served as an official artist in France with the Brit. and Canadian forces. He was principal of the Royal College of Art from 1920 to 1935 and prof. of civic art at Sheffield Univ. from 1917 to 1926. His work includes lithographs and etchings as well as landscapes and portraits and interiors in oils and is represented in the prin. galleries of Great Britain the Dublin Gallery of

and 1937. He completed over 200 portraits of armen during the Second World War which he presented to the nation. He wrote *Oxford Characters* (1896) *English Portraits* (1898) *Manchester Portraits* (1911) *A Life of Goya* (1900) *A Plea for Wider Use of Artists and Craftsmen* (1917) *A Cent in the 1920s* *Men and Memories* (vol. I 1931 vol. II 1932 vol. III 1939). He was knighted in 1931. See J. Rothenstein *The Portrait Drawings of William Rothenstein* 1926.

Rotherham, (c. 60,000) bor. of the W. Riding of Yorkshire, England, situated between Sheffield and Doncaster at the junction of the Rother with the Don 6 m. from Sheffield. It is a busy modern centre of industry and commerce. There is coal-mining in the vicinity and it is the railway clearing house of a large colliery area. There are large iron and steel and brass works. Iron and steel sheets, bars and rods etc. are made as well as a wide range of manufactured articles, such as

rills wheel disks cranks and piston rods. Other industries include general engineering glass blowing corn milling the manu of oxygen and of windows doors and staircases. R's most important architectural and historical building is the par church of All Saints dating back to Saxon times. The present building is a very fine specimen of the Perpendicular style and contains some fifteenth century stalls and benches and a fine pulpit (1603). The chapel of Our Lady (c 1483) on the old R Bridge is one of only four extant chapels built on bridges in England. The chapel was later used as the bn prison but in 1924 it was restored and rededicated. In 1930 a new bridge over the Don at this point was completed. Important modern buildings include the tn hall the council offices and the central public library. The grammar school for boys was founded in 1483. There are eleven parks and open spaces covering 300 ac. In Clifton Park is the mansion house which has been converted into a museum. Places of interest in R include Combsborough Castle (mentioned in Scott's *Travels*), Roche Abbey and Wentworth Woodhouse. There was a Roman post near the present centre of the tn and R in Dorsetshire Bk is mentioned as possessing a church and a mill. The industrial list of R begins in 1716 when the first furnace for iron working was built by Samuel Walker. It became a corporation in 1871. It is a poor constituency. Pop. 91,100.

Rothermere, Sir Harold Sidney Harmsworth Viscount (1868-1940). But newspaper proprietor (younger brother of late Viscount Northcliffe *q.v.*) b in London. Became at twenty one partner in publishing business (known then as Harmsworth Brothers later as the Amalgamated Press). When the *Pictorial News* was taken over by the Harmsworth house he reorganised that paper and he assisted in the founding of the *Daily Mail* (1896). He founded the *Daily Record* Glasgow. In 1910 he founded the King Edward chair of English literature Cambridge and received a baronetcy. From 1914 having already severed his connection with his brother's papers his organ was the *Daily Mirror* supplemented by his founding of the *Sunday Pictorial* a year later. On the death of Lord Northcliffe in 1922 R acquired control of the *Daily Mail*. Before his death R raised his holding of shares which gave him a controlling interest in the *Daily Mirror* on the Stock Exchange. Under his control it had reached even by 1922 a circulation of over 3,000,000 and had become well known for its pub of sensational pictures and articles. Its political views however did not become left wing until after R's connection was severed. R became Baron R in 1914 and received a viscountcy in 1919. During the First World War he was air minister (1917-18). See Viscount Camrose *British Newspapers and their Controllers* (revised ed.) 1948.

Rothas, burgh of Morayshire, Scotland on the R Spey, 10 m S.W. of Elgin. It has distilleries. Pop. 1400.

Rothsay, David Stewart, first Duke of (1378-1402) son of Robert III of Scotland. He succeeded to his father's original title of earl of Carrick. Owing to the king's defects of character the management of the affairs of the kingdom devolved on his brother the earl of Fife, but the estates decided that David then earl of Carrick, as heir to the throne should assume sovereign powers and at the same time David was created duke of R and his uncle Fife was made duke of Albany, these being the first examples of the dual title in the hist of Scotland.

Rothsay, royal and municipal bor and town of Buteshire Scotland, on the is of Bute 30 m W of Glasgow. There is a good harbour fishing is carried on and it is a popular tourist centre and holiday resort. In 1816 the ruins of Bute restored the ancient castle (founded in 1098). Craigmore adjoins P on the I and Port Bannitine on the N. Pop. 11,000.

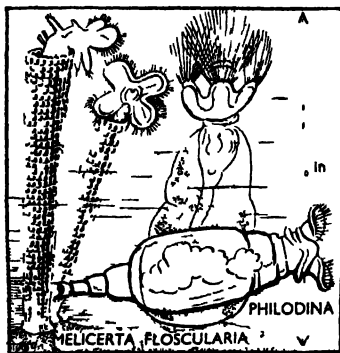
Rothorn, Swiss mt mass (7714 ft) overlooking the N shore of Lake Brienz. The fine panorama from the top attracts tourists who can come by mt railway from Brienz.

Rothschild, Jewish family famous for their immense financial transactions. The founder of the family was Mayer Amschel R (1743-1813) of Frankfurt on Main. There are various theories as to the origin of the surname some tracing it to a place name but it is most generally supposed to represent the red shield which was the sign of the house at Frankfurt. After the founder's death his eldest son Amschel Mayer (1773-1855) carried on the Frankfurt business the other four sons having opened ranches Solomon (1774-1826) at Vienna Nathan Mayer (1777-1836) in London Karl (1780-1855) at Naples and James (1792-1868) at Paris. One reason of their success was collaboration. In the London house Nathan was succeeded by Lionel (1808-79) who was returned to Parliament for the city of London in 1841 and 1852 but on account of his fifth was unable to sit until 1858. He was M.P. till 1874 and at his death was succeeded in the business by his son Nathan (1840-1911) who was raised to the peerage as Baron Rothschild in 1885. Nathaniel Mayer Victor R (b 1910) succeeded to the title as third Baron in 1937. See Count Court *The Rise of the House of Rothschild* 1928 and M. L. Rivage *The Men of Frankfurt* 1929.

Rothwell 1 Urb dist 4 m S.E. of Leeds in the W Riding of Yorkshire, England. There is a educational grammar school. The dist has coal mines and rhubarb is grown. Pop. 24,300. 2 Urb dist 4 m N.W. of Kettering in Northamptonshire England with manu of boots and shoes and agric implements. Pop. 1800.

Rotifera, or **Wheel Animalcules**, phylum of minute animal most of them about one hundredth of an inch and the largest not more than one eighth of an inch in length. They occur mostly in fresh water, but a number of species have been found in the sea and others in damp moss. There are eighty four genera with some

700 species. Their distribution is very extensive, and experiments by James Murray, while in the Antarctic with the Brit. Antarctic expedition (1907-9), showed that 40 R did not kill them, and they were able even to survive being raised from such a low temp to nearly boiling point within a few hours. The fresh water forms which are numerous in the Antarctic were also able to endure a month's immersion in brine. R, in spite of their small size are fairly complicated in structure, they are triploblastic (three layered) and consist of head, body, and foot. The head bears a disk of cilia the movements of which suggest a rotating wheel. These wash the food into the mouth and also propel the animal through the water. The head contains a brain and in many species two or more



PHILODINA

red or violet eyes though some are eyeless. The body varies in shape but is generally transparent and allows of easy inspection under the microscope of the digestive system, which consists of a gizzard or mastax and stomach. Though absent in some species in the majority there is a well developed foot which may be retractile or telescopic and is often furnished with a gland which secretes an adhesive material. A number are parasitic on water insects and worms. The females of all species greatly preponderate in numbers, and the production of unfertilised eggs is usual except in the autumn when special eggs are laid which hatch into males only. In a very brief life they fertilise the winter eggs, which are able to survive a variety of unfavourable conditions.

Rotomahana, small lake to the S E of Lake Tarawera, in a hilly country to the S E of the co of Rotorua. N. Is. New Zealand. The pink and white terraces on the borders of R were destroyed by the eruption of the volcano, Mt Tarawera on June 9, 1886, and the lake is now a deep crater, in which a new warm lake has formed, of 2 sq m in area.

Rotor, revolving part of an electric generator (*q v*), electric motor (see *ALTERNATING*).

TRIC MOTORS) or turbine (see *HYDRO-ELECTRIC POWER*, *FURBINS*, *STRA*). See also *AUTOGR*.

Rotorua, name of a co and of a tn and lake in that co in N. Is., New Zealand. The co is inland and in the N. It is intersected by 176 E and 18 S. The tn is situated on the S W flanks of the lake and hills over 2000 ft in height. Tourists are attracted by the luxuriant and volcanic countryside known usually as the Hot Spring dist. (see *GISSER*) and in this come for baths in the sulphurous alkaline and siliceous springs. It is a Maori centre and is owned and managed by the state as a health and tourist resort. Close by is the Maori vil. of Ohinemutu. The lakeshore and the lough is of volcanic origin only two features in the splendid scenery of the lake with which Lake Rotiti to the N E communicates. Apart from tourism, saw milling is a basic industry. Pop. (co) 10,000 (tn) 7,000.

Rotrou, Jean de (1601-60) Fr dramatist b. at Dreux where he became a magistrate. With Corneille he joined the brigade of Richelieu (1633) a society formed to give expression to the cardinal's dramatic ideas. A fertile writer, R borrowed a great deal from Sp. plays and shows a strong bias towards romanticism. His best plays are the tragedies *Chagrin et Dorothée* (1630), *Symon et Jodan* (1646) and *Venceslas* (1646). See study by J. F. J. 1965.

Rotten Borough, see *ROTTERDAM*. **Rottenburg** tn of Württemberg Ger. 6 m from Tübingen. There is a 15th century cathedral and a museum containing interesting Roman remains. Hops are grown in the vicinity, there are woollen and spinning industries. Pop. 7,700.

Rottenstone, reddish or greyish brown stone composed chiefly of alumina. It occurs in Derbyshire, England and in Albany, New York. A soft yielding stone it is useful for cleaning and polishing metals.

Rotterdam, the most important harbour tn of the Netherlands and also the largest tn but one of the country is situated in the prov. of S. Holland at the IJmmer estuary at a distance of 6 m S W of Amsterdam. The New Waterway which is 20 m long and well navigable for the largest sea going vessels connects the tn with the sea. The total length of the harbour quays is 17.2 m. The harbour quays have a total surface area of 1161 ac. The most important goods of supply are ores, cereals, mineral oils and wood, the mainly bulk products. Before 1910 the major export article was coal. The port owes its great significance to the transit trade to Germany and Switzerland along the Rhine. In 1938 the transit traffic of R ran into a figure of 32,000,000 tons and the national traffic to a figure of 12,000,000 tons. More than half of the Rhine fleet then consigned, and has continued to consist, of Dutch vessels. Before the Second World War R was the most important Atlantic port of the European continent. After the Second World War the traffic in the port of R only slowly rehabilitated

itself. This was mainly due to impediments to transit trade. The transit trade of R reached only 30 per cent of that of 1938 during the year 1949. For the total port traffic this percentage amounted to 50 per cent. Prominent R industries are shipbuilding, machinery plants, margarine and soap factories, chemicals, and foodstuffs. R was given municipal status in the fourteenth century. Its importance does not, however, date earlier than the middle of the nineteenth century, when the increasing Rhine shipping made it into a busy port. At the Coolingsluis a statue of Erasmus who was born in R. Several buildings, such as the Delft Gate, the old E. Indies House, and St. Lawrence's Church, were lost during the Ger bombardment of May 1940 which caused practically the whole centre of the tn. During the same bombardment more than 900 inhab. were killed and 24,600 dwellings destroyed, 11,000 buildings, 2400 shops, 1200 factories and workshops, 69 schools, 21 churches, and 20 banks were ruined. Large buildings which are still in existence are the Exchange, the tn hall, the post office, the White House, the Boymans Museum and some big business houses. The suburbs which once were independent communities have been joined to the actual tn of R in the course of the years, e.g. Charluis Kraaijen, Delfshaven, Katendrecht, Hoogvliet, Pernis, Hillegersberg. The pop. increased considerably as a consequence and amounted on Jan. 1, 1950, to 676,000. Reconstruction work was commenced immediately after the tn's liberation in May 1945. Apart from the reconstruction of the tn's centre, a long term project is planned for the construction of a dyke to protect a part of the tn which was formerly flooded at high tide, and a system of circular roads which will include the enlarged centre of which the Coolingsluis will be once more the prin. thoroughfare.

Rotti, is of Indonesia. S.W. of Timor. Cotton, sugar, soybeans, indigo etc. are produced. Pop. 7000.

Rotifera, genus of tropical plants belonging to the family Euphorbiaceae, and natives of Asia and Australia. *R. tinctoria* (or *Mallotus philippinensis*) from Malaya is important for two products, an orange dye and a remedy in cases of tapeworm.

Rottweil, tn of Württemberg, Germany, on the Neckar 68 m by rail S.W. of Stuttgart, manufacturing machinery, leather, gunpowder, and cotton. It was a medieval free city. There are sev. fine Gothic and baroque buildings. The Ger. Dye Trust had its main explosives factory in R. Pop. 12,800.

Rotuma, is (14 sq m in area) of the S. Pacific trading in copra, annexed in 1880 to the Brit. colony of Fiji, which lies 360 m S.S.W. Copra is exported. Pop. 3200.

Roturier (perhaps from Low Lat. *rup. farus*, one who breaks the earth) in the days of feudalism a citizen who held his ground by allodial tenure as opposed to knight service. Thus any one who was

not noble came to be designated R. Unlike the knights, the Rs were obliged to serve in the militia, and were put to death by hanging instead of decapitation.

Roualt, Georges (b. 1871), Fr. painter, b. in Paris. He served an apprenticeship under a painter of stained glass, and later studied at the Beaux Arts under Moreau. R. belongs primarily to the Expressionist school, though his work possesses some of Rembrandt's mysticism. His tragic religious paintings set him apart from contemporary artists. He has illustrated many books. See study by M. Puy, 1920.

Roubaix, tn in the dept. of Nord, France, 6½ m N. of Lille. With Lille, La Madeleine, Croix, Tourcoing, and Wattrelos, it forms a busy industrial dist. Woolens and all kinds of textile fabrics are manufactured. It was a prosperous cloth making tn in the fifteenth century, under the dukes of Burgundy. There is communication by canal with the Scheldt. Pop. 100,900.

Roubillac, Louis François (169-1762), Fr. sculptor, b. in Lyons, and trained under Costou in France but worked in England. In Westminster Abbey is his monument to Handel, and in Golden Square stand his statues of Sir Isaac Newton and George I. He executed also a good bust of Pope and a statue of Shakespeare, now in the Brit. Museum.

Rouble, unit of the Russian monetary system. The international value has been nominal since 1917, but the official exchange rate in 1950 was 11.20 roubles = 1 £. There are 100 kopecks in one R.

Rouen, city and port of France, cap. of the dept. of Seine Inférieure, 87 m N.W. of Paris by rail and is an important railway junction situated on both banks of the Seine which is tidal above the tn and thus makes R. an important port. The older part of the tn is on the N. bank of the Seine, on the opposite side lies the manufacturing centre of St. Sever above which is the Ile Lavoie. Three bridges and ferries join both banks and outside the tn are important and growing suburbs and other tns, making R. the centre of one of the chief manufacturing and industrial dists. of France. The main industries are cotton spinning and weaving, dyeing flax, hemp, and jute spinning, petroleum refining, making of hats, boots, and shoes and soap making. There are also railway workshops at Sotteville and large machinery and chemical works. There is a large trade in iron, splits, timber, coal, etc., the docks are large and important, R. clearing a total tonnage of over 3,000,000 in a normal year. Broad modern roads have been driven through the old tn, but it remains full of interesting and beautiful buildings though many suffered heavy damage and some were totally destroyed during the Second World War. The cathedral on the site of an old church (burnt 1200), was built from the thirteenth to the beginning of the sixteenth century, the W. façade, a fine example of Fr. flamboyant style, has two towers of widely different dates, the N. mainly of the twelfth century, the S. not completed till the sixteenth;

the central spire 48 ft is modern. Despite the fighting in R in 1944 the great W façade remained intact but six chapels part of the ambulatory the vaulting of a portion of the nave and the stone work of the rose window of the N transept were destroyed. The church of St Ouen of fourteenth and fifteenth centuries with its octagonal central lantern is fine though spoiled by its modern W front. More beautiful still is St Maclou begun 1437 a perfect specimen of 15th Flamboyant architecture. Both contained fine stained glass but in 1914 the chancel of St Ouen and the S aisle of St Maclou were reduced to ruins. The two upper storeys of the tower of St Romain were badly calcined while the tracery of most of the windows was blown out. A number of minor buildings attached to the cathedral were also destroyed. The fifteenth and sixteenth century Palais de Justice where the *parlement* of Normandy once sat was totally destroyed. Buildings remaining include the Tour de Grosse Horloge with its neighbouring gate and the Tour de Jeanne d'Arc in which the saint was imprisoned before her burning in R (this is the only remaining part of Philip Augustus's castle). Of the fine domestic architectural remains the fifteenth century Hôtel de Bourghéroutelle is the most remarkable. The town library has a fine collection of antiquities and early illuminated MSS. Cornillon Géricault and Flaubert were natives of R.

The Romans Latinised the Celtic name *Raduma* into *Rotomagus*. It became important ecclesiastically as early as the third century when St Mellinus was its bishop. It was the cap of Normandy and here William the Conqueror died. Arthur was murdered and John of Arc was burned. The city underwent a protracted siege by Henry V of England. At the end of the fifteenth century R was the centre of the 15th Renaissance. It was occupied by the Germans during the war of 1870. It was an important Brit base during the First World War. It was taken by the Germans in June 1940 and recovered by the Allies in Aug 1944, after heavy bombing attacks. It also suffered from Ger demolitions. Pop 107,700. See T & Cook *Rouen* 1938. A. Maurris *Rouen* 1929 and P. J. Cathoux *Rouen au temps de Jeanne d'Arc* 1932.

Rouge, red powder used as a cosmetic. It is prepared by rubbing up a base such as Fr chalk with oil and a colouring matter. The colors used in the better qualities are carmine from cochineal and carthamine from the safflower. *Seueller's rouge* is a red powder used for polishing. It consists of the iron oxide obtained by calcining ferrous sulphate.

Rouge et Noir, or **Trente et Quarante**, see **TRIENT ET QUARANTE**.

Rougemont, Louis de, see **DE ROUGE MONT**.

Rouget de Lisle, Claude Joseph (1760-1836), Fr author, b at Louis le Saunier, famous for a single composition, the *Marseillaise*, which he composed at Stras-

burg in an outburst of patriotism. At the time he was captain in the engineers.

Rough Collie, see under **COLLIE**.

Rough Fell Breed, see **SHEEP**.

Rough-haired Pinscher, see **SCHNAUZER**.

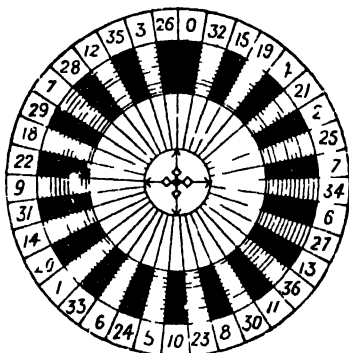
Rough Riders, term originally applied to those who broke in horses. Later it was used for cavalry and artillery soldiers who trained the horses. Certain bodies of mounted men raised for military service adopted the name e.g. the regiment raised by Theodore Roosevelt during the Sp. Amer. war.

Roulette see under **ORNAMENTS MUSIC**.

Roulers see **COINTEGRARI**.

Roulette, in mathematics curve traced by any point in the plane of a given curve when the latter rolls without sliding over another fixed curve. The rolling curve is the generating the fixed one the directing curve. The cycloid, cycloid et al. are simple examples.

Roulette, gambling game played with the aid of a wheel (*roulette*) set into the centre of an oblong table covered with a green cloth. The table is divided into three columns of figures marked from 1 to 36 alternately in red and black. The six spaces at the two sides of the columns of figures are called respectively *rouge* to mark red numbers, *noir* for black numbers, *impair* for odd numbers,



ROULETTE WHEEL

manqué numbers from 1 to 18 *pair* even numbers and *passé* all numbers from 19 to 36. The wheel itself contains a brass cylinder within a narrow inclined very little and is made to revolve on a pin by means of a cross head. The outer edge of this cylinder is partitioned into thirty-seven small compartments numbered irregularly from 1 to 36 and coloured alternately red and black the thirty-seventh space being the 0 or zero. The object of the game is simply to win money by placing stakes on a fancied number. The players having put their stakes on that portion of the cloth which represents the chance selected, the *tourneur* or croupier throws a small ivory ball round the ledge of the wheel, at the same time

revolving the cylinder in the opposite direction. When the wheel stops the ball drops into one of the little compartments, the number of which is the winning number. If for example it is 27 the croupier announces, 'Vingt sept, rouge impair et passe' rakes the lost stakes into the bank pays the winner, and goes on again as before. There are different methods of staking and the greater the odds, the smaller is the maximum stake allowed.

There is a simple form of roulette called *petits chevaux*. It is a species of race game the horses which are numbered being fixed on to some contrivance which enables them to be sent twirling round a model course. The horses are fixed in different relative positions and the one that is nearest the winning post when the wheel or other rotatory contrivance stops is the winner.

Roumania, see ROMANIA

Roumelia, see RUMELIA

Round, or *Rota*, kind of canon (*q.v.*) best defined by saying that its successive entries consist of complete melodies rather than mere phrases. The entries are thus apt to be further apart. Unlike canons *R's* are always in with the theme in its original position or in the octave never at other intervals. An older name for the *R* was *rota*. *Sumer is i-cumen in* known as the reading *rota* is a typical early *R*. A familiar later example is in the second finale of Mozart's *Così fan tutte*.

Rounds, or *Roundels*, country songs of the fourteenth century so called from the *Fr* *roundel* because their words returned to the opening lines again and again also round dances.

Roundels in heraldry general term for circular charges of various tinctures: those coloured gold are called bezants, silver plates, gules, torteaux, azure, hurts, sable pellets. Bezants and plates are shown flat the others spherical. A roundel blazoned Barry wavy silver and azure is known as a fountain.

Rounders, Lug ball game. It became popular in the eighteenth century, and at first had only a vague form on which players grafted their own individual rules. The R. Association of Liverpool and Vicinity and the Scottish R. Association were formed in 1889. Specific rules were fixed. The pentagonal field was changed to a diamond and a definite number of players and a fixed length of bat were established. The American baseball (*q.v.*) is founded on it.

Roundheads, nickname for the Parliamentary party during the 17th Civil War. It appears to have been used first in 1641 during the rioting which took place outside Parliament. It was a term of abuse referring to the close cropped hair style affected by some of the extreme sectaries. Misunderstanding has been caused by its application to the whole party. During the 1630s a number of Puritans had declaimed against the exaggerated court fashions. Prynne wrote a number of pamphlets specifically against 'love locks'. Surviving portraits however, show little fundamental difference

in hair style or costume between prominent Parliamentarian and Royalist leaders. Hyde Pym, Falkland, Hampden and the Vanes had a similar background and shared a common code of manners. Sobriety of dress was adhered to by some of the sectaries who were frequently of the commercial classes. Roundhead was strictly applicable only to a few enthusiasts its application to the whole party was an attempt to brand them all as fanatics and upstarts whereas in fact the Parliamentarians included as the default list of the Civil War shows a variety of types. Contemporary accounts for example give vivid pictures of the flamboyant fashions worn by Harrison the fifth Monarchist leader and the gaudy of dress and manners at Cromwell's court at Whitehall caused some comment. Originally used derisively the word like Puritan was generally disliked by the people to whom it was applied. It never seems to have been widely used and only achieved respectability and fame in nineteenth century Whig hist. Its use since then has tended to the over simplification of causes and personalities in a highly complex and fluid struggle. The Civil War was political and economic as well as religious in origin. The broad group in opposition to the monarchy in 1641 cannot be symbolised accurately by such a restricted expression. See also WAR CIVIL.

Round Robin (*Fr* *round* round and *ruban* ribbon) petition signed strictly in a circular form so that no individual's name need appear first. A famous protest in this form was sent by Reynolds, Burke, Gibbon and others to Dr Johnson imploring him to rewrite Goldsmith's epitaph.

'Round Table', political quarterly published in London at 24 founded in 1910 by a group of writers including Lionel Curtis, R. H. Brand and other specialists on Imperial and international affairs.

Round Table Conference, name given to a discussion at a round table by groups representing different interests especially applied to the conferences held in London between 1930 and 1931 which resulted in the Government of India Act 1935.

Round Table, The. The exact origin of the *R. T.* is uncertain. It appears to derive from the Brythonic or Breton group of the Celtic peoples. It is part of the tradition of the Arthurian romance in which it is asserted that the knights of King Arthur's court quarrelled for precedence and that a cunning workman from Cornwall designed a table round in shape where all could sit equally. Wace is the earliest recorder of this tradition and Iavamon who trans his works gives a picture of the fight among the knights and tells us how the great table was built and that it could seat 1600 knights. In another version Merlin made the table for King Pendragon and another states that it first belonged to the father of Guinevere king of Cornwall. The literary development started in Breton France whence it passed to France Italy Spain and Portugal. The earlier legends are connected with that of the Holy

Grail, some persons asserting it was built as a copy of the table used at the Last Supper. In the Great Hall at Winchester is a R. T. which was presented to Henry VIII.; it was known to have existed in Henry III.'s reign, and was regarded as a great curiosity; it has seats for the king and twenty-four knights. The tradition of the R. T. is not common to all Celtic nations. It is not found amongst the Goidehc Celts (Irish, Gaelic, and Manx), and not amongst other, extinct, Celtic nations (those of 4. France, N. Italy, etc.).

Roundway Down, hill, 2 m. N. of Devizes, Wiltshire, where the Royalists under Sir Ralph Hopton, aided by reinforcements of Prince Maurice, defeated the Parliamentarians under Waller in July 1643.

Roundworms constitute the group (phylum) of Nematoda. They are unsegmented and thus distinct from the ringed worms (Annelida). R. have no true body cavity, blood, or respiratory systems, and are mainly parasitic. Species of *Tylenchus* and *Heteroda* attack cultivated plants. 'Hoosie' or 'hush' of cattle is caused by *Dictyocaulus* (*Strongylus*) in the bronchioles of the lungs. R. parasitic in man include *Oxyuris* (thread-worm), hook-worm (see *ANKYLOSTOMIASIS*), *Dracunculus* (guinea-worm), *Filaria* (see *FILARIASIS*), and *Trichina* (see *TRICHINOSIS*). See also NEMATODES.

Roup, common contagious disease of poultry, game, and cage birds, characterised by a thick discharge from the eyes and nostrils which makes breathing difficult and gives rise to an offensive odour. It is generally traceable to dirt and overcrowding, and is accentuated by cold and damp. When an outbreak occurs healthy birds should be immediately removed to cleaner surroundings, and those attacked should be placed in a warm, dry enclosure. The head should be frequently cleansed with a disinfectant such as hydrogen peroxide. For the prevention and cure of R. and all allied diseases certain preparations are available which, added to drinking water and soft food are very effective.

Rouse, William Henry Denham (1863-1950), Eng. classical scholar and linguist, b. at Calcutta, and educated at Haverfordwest Grammar School, Doynton College, Calcutta, and Christ's College, Cambridge of which he was later a fellow. From 1902 until 1928 he was headmaster of Perse School (q.v.), Cambridge, which became widely known under his influence. He will be chiefly remembered as a Gk. and Lat. scholar, though he also had a wide knowledge of Sanskrit and of modern languages.

Rousseau, Henri Julien (1844-1910), Fr. painter, b. at Laval. He never studied art, and became a customs official in Paris after the Franco-Prussian war. His pictures in his stationer's shop drew the attention of many famous artists, and between 1886 and 1910 he exhibited at the Salon des Indépendants. R. reacted against the fashionable Impressionism and Cubism by his simple rendering of natural objects, painting realistically, but without criticism. His bold, vivid jungle scenes are especially well known. See study by P. Courthion, 1944.

Rousseau, Jean Jacques (1712-78), Fr. writer and philosopher, b. at Geneva, his father being a watchmaker. His education was a poor one, and he received no teaching but that which the vil. school could supply. He was then apprenticed to an engraver, by whom he was very badly treated. His own behaviour was not exemplary, and he ultimately fled into Savoy, where he was taken under the protection of Mme de Warens, who procured admission for him into the College of the Catechumini at Turin, a seminary for the training of Rom. Catholic clergy. Since he did not wish to take orders, he was compelled to leave this establishment and took up his residence with Mme de Warens.



JEAN JACQUES ROUSSEAU
Engraving after a picture by Latour

near Chambéry. He left her in 1740, and after following a variety of occupations became acquainted, in 1748, with Mme d'Épinay, who proved one of his truest friends. Diderot, with whom he became acquainted, invited him to contribute to the *Encyclopédie*, but it was not until he was thirty-seven that he first made a name. The academy of Dijon offered a prize for an essay on the progress of civilisation on morals and R., in his *Paradoxical Oration on the Arts and Sciences* (the earlier of his two *Discourses*), developed his famous paradox, probably suggested by Diderot, of the superiority of the savage state, winning the prize (1750). The second of his *Discourses* was the much less successful but equally meritorious one on *The Origin of Inequality* (1753). It was at Mme d'Épinay's house at Montmorency, where he had taken up his residence in 1756, that he commenced *Julie, ou la nouvelle Héloïse*, which he finished in 1759. This was surpassed by *Émile*, which appeared in 1762 and expounded a new system of education, based on natural development and the power of

example, which was to have a widespread effect upon European educational theories. In 1762 he also pub. *Contrat social* (q.v.) in which he expounded his theory of the surrender of the individual's natural rights to the whole society under the sovereign direction of the 'general will' (see under POLITICS). His writings equally offended the gov., the clerics, and contemporary philosophers, and later works such as *Lettres de la Montagne* increased the feeling against him. R. left France to avoid arrest, and on being ordered out of the republic of Berne, in 1766 he came to England at the invitation of David Hume, but quarrelled with him and returned to France in 1770. In 1778 the marquis de Guardin offered him a permanent home at the Château d'Ermenonville. Here he died. There is a collected ed. of R.'s works by V. D. de Musset-Pathay (1823-1826), and trans. in Everyman's Library of *The Social Contract and Discourses* (1913), *Confessions* (1931) and *Emile* (1911).

See lives and studies by J. Morley, 1873, 1886; H. G. Graham, 1882; F. MacDonald, 1906; A. L. Selis, 1929, C. E. Vulhamy, 1931; and R. Rolland, 1948. also T. Davidson, *Rousseau and Education according to Nature*, 1898; E. H. Wright, *The Meaning of Rousseau*, 1933, and H. Hoffding, *Rousseau und seine Philosophie* (5th ed.), 1936.

Rousseau, Pierre Étienne Théodore (1812-67), Fr. landscape painter, b. at Paris, and studied under Rémond and Guillon-Lethière. He led the movement against the then prevailing classical style, and was the founder of modern Fr. landscape. The Salon was hostile to his work for a long time and that of the other Romanticists, so in 1833 he retired to Barbizon, where he spent the latter part of his life. His work combines excellence and minuteness of detail with breadth and harmony of colour. See study by A. Samsor, 1972, and R. Huyghe *Millet et Rousseau*, 1912.

Rousselaere, see **ROULERS**

Roussillon, former prov. of France, corresponding in the main to the modern dept. of Pyrénées-Orientales. Its cap., Ruscino (from which the prov. derived its name), was the place of gathering for the Gallic chieftains in the days of Hannibal. Later Perpignan became the cap. Until the seventeenth century Spain and France disputed the ownership of R., but the prov. finally passed to France in 1659.

Roussy, Anne Louis Girodet de, see **GIRODET-TROISNON**.

Routledge, George (1812-88), Eng. publisher, b. at Brampton, Cumberland. He served an apprenticeship to a bookseller in Carlisle, and later started in the publishing business on his own account (1813). See also next article.

Routledge and Kegan Paul Ltd., firm of Brit. book publishers, founded in 1834 by George Routledge (q.v.) as Routledge & Company, the name being later changed to Routledge & Sons. The firm made a great success of its *Railway Library*, and was also noted for its outstanding illustrators. In 1911 the firms of George

Routledge & Sons Ltd., and Kegan Paul, Trench, Trubner & Company Ltd., were amalgamated, and completely fused as R. and K. P. L. in 1947. Nicholas Trubner, an orientalist, had founded a firm specialising in oriental pubs. In 1851. On his death this business was bought by Kegan Paul, Trench & Company Ltd., founded by Charles Kegan Paul and Alfred C. Trench, and famous for its theosophical and poetical works. The firm, as constituted in 1947 publishes all types of literature, and especially works of a specialist character, and novels of international appeal.

Rouvroy, Claude Henri de, see **SAINT-SIMON, COMTE DE**.

Roux, Cesar (1857-1934), Swiss surgeon, b. at Mont-la-Ville. In 1890 he became first prof. of the surgical faculty at Lausanne. His research did much to reduce the danger from operations on the appendix, and he also contributed improved methods of treatment for tuberculosis of the lungs. See study by P. Decker, 1935.

Roux, Pierre Paul Emile (1853-1933), Fr. bacteriologist, b. at Confolens, Charente; he studied medicine at Clermont-Ferrand, and in 1878 he entered Pasteur's (q.v.) laboratory, becoming its director in 1904. With Yersin he demonstrated that the toxic fluid free from bacteria will produce the symptoms of diphtheria, and that the so-called Klebs-Löffler bacillus is the true cause of that disease. He further designed a bacteriological incubator (manufactured by Lequeux of Paris) with a bimetallic thermostat to control the temp.

Roux, tn. in Hainaut, Belgium, 4 m. N.W. of Charleroi, on the canal to Brussels. It has coal-mines and manufs. of iron goods, mirrors, and cement. Pop. 9500.

Rovere, Giuliano della, see **JULIUS** (popes), **Julius II.**

Roveredo, or Rovereto, tn. of Italy, in the Trentino, 134 m. S.S.W. of Trent. There are sev. medieval buildings. Antonio Rosmini-Serbati (q.v.) was b. in R. It is the industrial centre of the Tyrol, has a silk industry, and manufs. of leather and violin strings, etc. Pop. 16,000.

Rovigo: 1. Name of a prov. and its cap. in Venetia, Italy, which cultivates cereals, vines and the silkworm. The prov. has an area of 685 sq. m., and a pop. of 316,800. The tn. is situated on the Adige to Canal, 27 m. by rail S. of Padua. It is noted for its library, picture gallery, church of La Madonna del Soccorso, and cathedral (1696). Manufs. include textiles, leather goods, and candles. Pop. 15,700. 2. Vil. 16 m. S. of Algiers, in Algeria. Pop. 12,000.

Rovinj (It. **Rovigno**), Yugoslav seaport, 75 m. by rail S. of Trieste, in Istria, Italy. Surrounded by olive gardens, hazel-trees, and vineyards, it is itself the centre of sardine and tunny fisheries, and has also cement and marble works. Formerly in Austria-Hungary, R. was ceded to Italy after the First World War. In 1947 it was ceded to Yugoslavia under the peace treaty. Pop. 11,000.

Rovno, tn. and region of the Ukrainian S.S.R. The tn. is 110 m. from Zhitomir and is an important railway junction. Its prosperity was founded by Jewish merchants, who built up a large agric. trade. In 1920 R. was ceded to Poland and reverted to its Polish name of Równe. It was in ter. occupied by Russia in 1939 and was the centre of local Ger. administration after 1941. The Russians recaptured it after a spectacular advance in Feb. 1944, and in 1945 it was ceded to Russia under the terms of the Russo-Polish treaty.

Rovuma, riv. (475 m. long) of E. Africa, with two head-streams, the Lujenda and Rovuma, rising E. of Lake Nyasa, and flowing E. to the Indian Ocean, which it enters 22 N.W. of Cape Delgada. It is not navigable.

Row, John (c. 1525-80), Scottish reformer; won over to Protestantism by Knox's preaching, he was four times moderator of the General Assembly, and assisted in drawing up the Scottish Confession.

Rowallan, Thomas Godfrey Polson Corbett, second Baron (b. 1895), chief scout of the Brit. Commonwealth, b. at Gourrock, W. Renfrewshire, and educated at Eton. R. succeeded to his father's title in 1933. He served in both world wars and commanded a battalion of the Royal Scots Fusiliers from 1940 until 1944.

Rowan, see MOUNTAIN ASH.

Rowe, Nicholas (1674-1718), Eng. dramatist and poet, b. at Little Barford, Bedfordshire, and educated at Westminster School. He was called to the Bar, but abandoned his profession to become a playwright. His dramatic works were mainly tragedies, and include *The Ambitious Stepmother* (1700); *Tamerlane* (1702); *Ulysses* (1706); *The Royal Convert* (1707); *Jane Shore* (1714); and *Lady Jane Grey* (1715). From 1715 he was poet laureate in succession to Nahum Tate. R. enjoyed a tremendous vogue during his lifetime; he possessed a keen sense of the dramatic, a grip of situations, and was a master of pathos.

Rowing. Eight-oared and four-oared R. originated in England and was practised principally on the Thames in the eighteenth century. At that time it was usually associated with fêtes, galas, and ceremonial occasions. In the early years of the nineteenth century this processional and ceremonial emphasis gave way to the competitive element which culminated in the first Oxford and Cambridge boat race in 1829.

At the present time the practice of R. is world wide and the most important racing events take their place in the Olympic games which are held every four years. The Olympic regatta comprises seven events: eight-oar; four-oar with and without coxswain ('cox'); pair-oar with and without cox; and double and single sculls. The European championships, open to the world and including the same events as the Olympics, take place annually on various European courses, while similar championships are held each year in the Americas.

Regattas, held at four-yearly intervals, are usually included in the programmes of the Empire games, which in recent years have become increasingly popular events in the sporting curriculum. Henley regatta has for long been recognised as the world's most famous regatta; with the exception of intervals created by two world wars, it has taken place annually since 1839. The programme includes both open and closed events. There are four eight-oared challenge cups; the Grand which is open to the world; the Ladies' Plate which is confined to schools and colleges; the Thames cup, an open race for second-class crews, and the Princess Elizabeth cup which is confined to schools and intended to encourage school boat clubs who do not consider themselves of Ladies' Plate standard. There are three four-oared events: the Stewards' challenge cup, with the same qualifications as the Grand, and the Visitors' and Wyfold challenge cups, corresponding to the eight-oared events of the Ladies' and Thames cup respectively. In addition to these there are three other open events: the Goblets for pair oars, the Double Sculls, and the single or Diamond Sculls. Neither fours nor pairs with coxswains are included in the Henley programme. Other ann. regattas are held at most of the Thames-side tns., such as Marlow, Reading, Staines, Kingston, and Molesey, while great energy and initiative have been shown in the provs. In the organising of a large number of regattas. At such centres as Chester, Newcastle, Edinburgh, Glasgow, Nottingham, York, Bristol, Norwich, Bedford, and Burton-on-Trent, and in the many clubs situated on tideway waters, R. is practised with enthusiasm and keen competition. Most oarsmen attaining international distinction come from the univs. of Oxford and Cambridge, from Leander, or the prin. Metropolitan clubs, London or Thames.

In Britain the most popular ann. R. event is the Oxford and Cambridge boat race. It is rowed in late March or early April (depending upon a suitable tide) from Putney to Mortlake, a distance of approximately 4½ m. In spite of its many twists and turns this course, except in abnormal conditions, is a very fair one. The start is made on the flood tide, about 1½ hrs. before high water at Putney Bridge. The training for this race occupies from nine to ten weeks. Each univ. crew starts practice on their home waters, and after a further period on adjacent waters they move to Putney for the final three or four weeks. In the first half of this century Oxford lost the substantial lead they had held in this series of races and finished the half-century nine victories in arrears. On approximately the same date as the boat race there is held annually the most popular race in the world—the Head of the River Race. This is rowed on the ebb-tide over the boat-race course from Mortlake to Putney. Each crew starts from and finishes at the same point, and results are judged by an efficient system of electrical timing. Over 200 eights

have been known to compete in this gigantic event. This form of competition has been followed up and down the country wherever a suitable course is available.

At Oxford and Cambridge R. is organised on an inter-college basis. The main eight-oared events are bumping races, and all other events are time races. Crews start a certain distance apart and row to finishing posts the same distance apart, the result being judged on a time basis by signals lowered at the respective finishes. Bumping races are held at both univs. in the Easter and summer terms. At Oxford these are called the 'Torpids' and the 'Summer Nights,' and at Cambridge the 'Lents' and the 'Mays.' The boats, manned by eight oars, start approximately a length apart at Oxford and a length and a half at Cambridge, and row over the course, the order is decided by the previous year's results. There is racing for four nights at Cambridge and six nights at Oxford and a boat touching the one above it precedes it in the following day's racing. Besides these events there are inter-college four-oared events, and pair-oar and double- and single-sculling trophies.

The world's governing body for amateur R. is the Fédération Internationale des Sociétés d'Aviron, *F.I.S.A.*, abbreviated to F.I.S.A. This body, with its headquarters in Switzerland, has a code of rules and regulations based on the original king's conception of amateur oarsmanship. Each subscribing country sends delegates to its congress each year, which is held at the centre chosen for the European championships. Olympic regattas are held under the auspices of the F.I.S.A. In Great Britain the main governing bodies are the Amateur R. Association (A.R.A.), the National Amateur R. Association (N.A.R.A.), the Scottish Amateur R. Association, and the Women's Amateur R. Association. Of these the A.R.A. and the N.A.R.A. control the vast majority of oarsmen in this country. They owe their separate origins to a different conception of what constituted an amateur oarsman. These differences have now been eliminated and a desire has been expressed for an amalgamation of the two bodies under the title of the Brit. Amateur R. Association. With the Scottish Association they have already formed a joint committee for the consideration of international R. affairs in so far as they affect Great Britain. See also SCULLING.

See R. P. P. Rowe and C. M. Pitman, *Rowing* (Badminton Library), 1903, S. Fairbairn, *Rowing Notes*, 1928, *Some Secrets of Successful Rowing*, 1930, and B. Cross (ed.), *Chats on Rowing*, 1918; G. O. Nickalls and P. C. Mallam, *Rowing*, 1939, 1949; B. C. Fisher, *Rowing and Athletics*, 1948, and A. H. Grubb, *Rowing, Sculling, Canoeing, and Punting*, 1949.

Rowland, Henry Augustus (1848-1901), Amer. physicist, b. at Honesdale, Pennsylvania. He graduated from Rensselaer Polytechnic Institute, Troy, in 1870, and was appointed to the chair of physics at the Johns Hopkins Univ. in 1876. Two of his most outstanding

achievements were the determination of the value of the ohm and his method of making diffraction gratings for use in spectroscopy. His pubs. included *Studies on Magnetic Distribution* (1875) and *On Concave Gratings for Optical Purposes* (1883).

Rowland, James Peter (1875-1948), Eng. meteorologist and astronomer, b. at Blackburn, and educated at local Roman Catholic schools, Stoneyhurst College, and London Univ., where he took a science degree in 1906. He joined the Society of Jesus in 1894. After teaching mathematics and physics for some years he became assistant director of Stoneyhurst College Observatory in 1919 and its director in 1932. He developed the magnetic, meteorological, and seismic work of the observatory until it closed in 1947, and also carried out a number of important astronomical observations, especially on sunspots and the determination of the rotation period of Saturn from observations of the white spot discovered by Huygens in 1633.

Rowlandson, Thomas (1756-1847), Eng. caricaturist and painter, b. in London. He studied art in London, and in 1777 settled there as a portrait painter. Later, after 1781, he inclined towards caricature, and it is in this branch of pictorial art that he did his best work. He satirised society in all its aspects, and his drawings are invaluable as casting a light upon the age in which he lived. He contributed to Ackerman's *Poetical Magazine* (1809) to accompany Wm. Coube's *Tour of Dr Syntax* (pub. in book form, 1812-21), and illustrated many books, including *The Microcosm of London*, the topographical plates of which were executed by Fugni. See studies by J. Grego, 1880, A. P. Oppé, 1923, B. Falk, 1949, and A. McIntzelman, 1950.

Rowley, William (c. 1585-c. 1642), Eng. dramatist. He served sev. companies of actors, including the king's servants, as a comedian. He claimed to be sole author of *A New Wonder, A Woman never Told* (1632) and *All's Lost by Lust* (a tragedy, founded on a Sp. text, 1633).

Rowley Regis, municipal bor., comprising the tns. of Cradley Heath, Old Hill, Blakheath, R. R. and Tindale, in Staffordshire, England, 5 m. W. of Birmingham. There are ironworks and potteries. R. R. forms, with Tipton, a bor. constituency. Pop. 49,400.

Röwne, see ROWNO.

Rowntree, Arthur (1861-1949), Brit. scholar and educationalist, b. at Scarborough, of Quaker parents, and educated at Bootham School, London Univ., and Heidelberg Univ. From 1899 until 1927 he was headmaster of Bootham School, which under him became well known. He pub. numerous pamphlets on education, hist., and literature.

Rowntree, Benjamin Seebohm (b. 1871), Brit. sociologist, b. at York, of a prominent Quaker fam., and educated at the Friends' School, York, and Owen's College, Manchester. He became a director in his father's chocolate firm, and was chairman from 1925 until 1941. In his own

business affairs he has applied many of the reforms which he advised in his pubs which include *Poverty a Study of Town Life* (1900) *Unemployment* (1911), *The Human Factor in Business* (1921) *Poverty and Progress* (1911). R was chairman of the National Institute of Industrial Psychology.

Rowntree & Company Limited, cocoa chocolate and confectionery manufacturers of York. Overseas companies in Fine Canada, S. Africa and Australia. The business dates back to 1723 when Mary Tuke, a Quaker, opened a little shop in York to sell groceries. By 1775, this shop had become Wm. Tuke & Sons, and was dealing in cocoa. In 1862 the cocoa side of the business was taken over by Henry Isaac Rowntree. Premises in Llaner Moat, York, were acquired and in 1869 Henry Isaac with his brother Joseph his partner formed H. I. Rowntree & Company. Henry Isaac died in 1883 leaving Joseph in sole control until joined by his sons, John Wilhelm and Benjamin Seeborn. In 1897 the firm became a limited liability company with Joseph Rowntree as chairman. In 1890 land on the outskirts of York was bought and the first of the present factory buildings erected. Since then there have been many extensions and the factory now covers approximately 20 ac of the 100 ac estate which includes recreation grounds and many other facilities for the welfare of the employees.

Rowton Heath, open heath 3 m S.E. of Chester, it was the scene of a Royalist defeat in Sept. 1645.

Rowton Houses are registered lodging houses where bachelor working men at a nominal inclusive charge a night can obtain a night's lodging and the use of a reading room. The first R. house was founded by Lord Rowton in 1892 and similar houses have been erected in London by the R. H. Company Limited and the London Co. Council. The plan has also been followed in various European countries and in the U.S.A.

Roxana, daughter of the Russian Prince Oxyartes. She fell a captive to Alexander, who married her for her beauty (327 B.C.). After Alexander's death she gave birth to a son (Alexander IV) and after a life of persecution and wandering was finally murdered in 311 B.C.

Roxburghe, Duke of, see **KER FAMILY OF Roxburghe Institute**, see **BOOK CLUB**.

Roxburghshire, a inland co. of Scotland sometimes called Teviotdale. It is bounded N. by Berwickshire, W. by Selkirkshire and Dumfriesshire, S. and E. by the Cheviot Hills and is part of the Scottish Borders. Its greatest extent from W. to E. is about 40 m. and from N. to S. 30 m. The surface of the co. is diversified with hill and moor interspersed with well watered and fertile valleys. The highest peak in the co. is in the Cheviots (Auchopeclair, 2380 ft.) but there are several hills with over 1000 ft. elevation. The co. is watered by the Tweed, the Teviot, the Liddel, and the Bowmont, with their numerous tributaries. It is a fine grazing country, thousands of sheep and

cattle being supported on its grassy slopes. Agriculture flourishes, other industries being the manufacture of woollens and tweeds, farm tools, hosiery and coaches. Horticulture is also engaged in. Jedburgh is the co. town but Hawick is the most important, others are Melrose, Kelso, Newcastle-on-Tyne, Berwick and Ednam. With Selkirkshire it returns one member to the House of Commons. It derived its name from the city and castle of Roxburgh, which once stood between the Tweed and the Teviot. The city is now only a ruin and of the castle there remain only green clay mounds and fragments of walls. James II. of Scotland was killed at Roxburgh Castle (1460) through the bursting of a cannon. Among the medieval buildings are the ruined abbey of Kelso, Jedburgh, and Melrose, which are very much visited by tourists on account of their historical interest. Chief among the castles of the border clans are those of Branxholme, Ferniehirst (now a Youth Hostel), Harnden, Smulholm (Essford) and Hermitage, which figured largely in the border forays although no very important battle has ever been fought within the limits of the co. Broom's Castle and Abbotsford are noted residences, the former being the seat of the duke of Roxburgh, who owns much of the land and the latter being famous as the home of Sir Walter Scott. It is situated on the right bank of the Tweed about 3 m. from Melrose, near the road leading to Selkirk. Area of R. 666 sq. m. Pop. 48,600. See J. Robson *Illustrated Scottish Borders* 1892. Sir Walter Scott *Minstrelsy of the Scottish Borders* 1819 and Sir George Douglas *Roxburghshire* 1898.

Roxbury, originally a city of Suffolk co. Massachusetts, U.S.A. absorbed in Boston in 1867.

Royal Academy of Music, London, the senior school of music in the British Empire, founded in 1822. It was under the direct patronage of His Majesty King George IV. who granted a royal charter in 1830. The present building in the Marylebone Road with a fine concert hall was opened in 1911. Fellows (F.R.A.M.) and associates (A.R.A.M.) are elected by the directors, and honorary members (Hon. R.A.M.) by the committee of management. Besides tutorial work in all branches of music, speech and drama, and teachers' training courses, it carries on examinations for the F.R.A.M. diploma. Many scholarships are offered for competition periodically.

Royal Academy, The, see **ACADEMY, Royal**.

Royal Aeronautical Society. This society was founded in Jan. 1866 under the title of the Aeronautical Society of Great Britain for the purpose of increasing by experiments the knowledge of aeronautics. Its first president was the eighth duke of Argyll. From the first the society concentrated on the possibility of heavier than air flight. In 1868 it held the first aeronautical exhibition at the Crystal Palace. Over 700 lectures on aviation have been read before it and it to belong all the leading aeronautical engineers in Great Britain, America and other parts.

of the world. The society holds examinations and publishes technical information of direct use to aircraft designers. Medals for designing and technical skill are awarded, and the society possesses an extensive library. It has many branches in Great Britain and Canada and divisions in Australia, New Zealand and South Africa. The membership (1950) including branches is 12,000. The headquarters of the R.A.S. are at 4 Hamilton Place London W.1.

Royal African Colonial Corps of Light Infantry, *see under* WEST AFRICAN FRONTIER FORCE THE ROYAL

Royal Air Force, *see* AIR FORCE ROYAL

Royal Air Force Regiment *see under* AIR FORCE ROYAL

Royal Army Medical Corps, *see under* MEDICAL SERVICE ARMY

Royal Army Ordnance Corps. The Board of Ordnance is one of the oldest departments of the military administration of the Crown but it did not establish its own factory until 1716. The corps was formed in 1831 primarily as a body of military storekeepers. It became Royal after 1913. Armourers of the corps are attached to regiments for the immediate repair of small arms, but its main function is the initial supply of stores and equipment of all kinds to garrisons and expeditionary forces.

Royal Army Pay Corps, corps of officers and men whose duties are divided between



Photo L. d.

ROYAL ARMY SERVICE CORPS

Early Second World War training at a field training

Royal Air Force Volunteer Reserve *see under* AIR FORCE ROYAL

Royal Armoured Corps *see* ARMOUR CORPS ROYAL

Royal Army Chaplains Department, *see under* CHAPLAIN

Royal Army Dental Corps. Dental care did not exist in the British Army until after the South African war. In 1910 it was realised that wastage of manpower through dental unfitness was too high and eight civilian dentists were attached to home commands. In 1914 thirty-two dental surgeons were given 1 A.M.C. commissions and attached to the expeditionary force. By 1918 their number had increased to 870. The Dental Corps as such was formed in 1921 and the prefix 'Royal' granted in 1946. The corps now consists of officers who are qualified dental surgeons and other ranks who are orderlies and dental mechanics. They are organised in static and mobile dental units and are also attached to field ambulances where their task is to assist in the treatment of facial and maxillary injuries.

Royal Army Educational Corps, *see under* ARMY, Educational Training

command pay offices and regimental pay offices. The former are located with military commands at home and abroad and their functions are to receive and disburse public moneys in respect of military services to afford technical advice on questions of pay and allowances and to cost certain military establishments. The regimental pay offices at home are affiliated to record offices and are responsible for the audit of the pay accounts of soldiers of the regular army, supplementary reserve and territorial army and for the payment of reservists and service pensioners.

Royal Army Service Corps. The Corps of Wagoners formed in 1794 had a short existence, and in 1799 the Royal Wagon Train was formed to perform transport work. This corps went through Wellington's campaigns in the Peninsula and at Waterloo and was disbanded in 1833. The Land Transport Corps formed in 1855 during the Crimean War was the direct forerunner of the R.A.S.C. In 1866 it was merged into the Military Train and in 1870 became the A.S.C. In 1877 the A.S.C. was divided into two branches

(a) the Commissariat and Transport and (b) the Ordnance Store Branch. In 1880 these branches were formed into separate corps. The Commissariat and Transport Corps (men only) was officered from the Commissariat and Transport Dept. In 1889 the officers and men were amalgamated in the second A.S.C. The corps has a distinguished hist., having been represented in almost every campaign fought by the Brit. Army. During the First World War the corps fulfilled its duties under enormous difficulties, and was a model for all such work. For its services it was granted the title of 'Royal.' As a result of the mechanisation of the army the Horse Transport companies were disbanded in the '30's. In the Second World War the R.A.S.C.'s maintenance of supplies to the Allies' invading armies in Normandy was a triumph of organisation, particularly after the fall of Caen when the allied armies advanced rapidly to the Seine and Belgium with ever-lengthening lines of communication.

Royal Army Veterinary Corps. In 1796 a permanent veterinary service was estab. in the Brit. Army. It consisted only of veterinary officers under the prin. veterinary officer, but all attached to units. In 1903 the corps was formed and its senior officer designated director general, Army Veterinary Services, with the rank of major-general. In general its organisation is parallel to that of the R.A.M.C., but as the use of horses and mules by the army has greatly decreased since its peak in 1918, the R.A.V.C. is now responsible for the supply of remounts and for the procurement and training of all animals in use by the army. The title 'Royal' was granted in 1918.

Royal Assent, see ASSENT. ROYAL.

Royal Australian Air Force. This was estab. at Point Cook, Victoria, as the Australian Flying Corps, in 1911. It became the R.A.A.F. in 1917. In the First World War squadrons were sent to France and Palestine. Between the two world wars considerable expansion took place. The R.A.A.F. distinguished itself in the Second World War in the Far. E. campaigns. During the Second World War the R.A.A.F. had a strength of approximately 124,000. *See also under AUSTRALIA History during the First World War and History during the Second World War.*

Royal Australian Navy. This was estab. in 1909. Previously a R.N. squadron had been stationed in Australian waters, its cost being shared from 1882 by Great Britain and Australia jointly. It is administered by a naval board under the federal minister of defence. In the Second World War its strength was 20,000. *See further under AUSTRALIA, History during the First World War and History during the Second World War.*

Royal Bank of Scotland, The. Scottish bank. Its head office is in Edinburgh, and it was incorporated by royal charter on May 31, 1727, and commenced business with a capital of £111,000. In 1728 the R. B. made a notable contribution to banking practice by inaugurating the

'cash credit' system. In 1864 the business of the Dundee Banking Company was acquired. Drummond's Bank in London (estab. 1717) was acquired in 1924 and the business of the W. branch of the Bank of England taken over in 1930, by which date the R. B. had over 200 branches. In 1930 the whole capital of Williams Deacon's Bank Ltd. was acquired, and in 1939 the whole capital of Glyn Mills & Co. The R. B. and these two banks constitute the 'Three Banks Group,' each bank continuing as a separate entity. The R. B.'s capital is £4,250,000, with a reserve fund of £4,559,706 at Oct. 1948, when its total assets were £155,175,898.

Royal Berkshire Regiment, see BERKSHIRE REGIMENT. THE ROYAL.

Royal Bounty, item of the civil list, fixed at £13,200 per annum in 1837, from which the Brit. sovereign makes official subscriptions and donations to charities. Subjects whose wives are delivered of three or more children at one birth receive the king's bounty, paid out of the R. B.

Royal Burgh, see BURGH.

Royal Canadian Air Force, see under CANADA, Defence.

Royal Canadian Mounted Police, name given to the former N.W. Mounted Police (q.v.) in 1920, when its jurisdiction was extended over the whole of Canada. It is administered by the Canadian minister of justice, and comprises some 4800 officers and men, divided into thirteen divs. It is now largely mechanised. The uniform consists of gold-striped blue breeches, scarlet tunic, and stetson hat. The R.C.M.P. has been responsible for enforcing the customs and excise Acts since 1932.

Royal Canadian Navy, see under CANADA, Defence.

Royal Cape Coast Militia and Volunteer Force see under WEST AFRICAN FRONTIER FORCE. THE ROYAL.

Royal College of Music, London, institution for musical study and training, founded in 1882 by Edward VII. as Prince of Wales. It succeeded the national training school. It was opened in May 1883, with Sir George Grove as director, and was incorporated by royal charter on May 23, 1883. Among the distinguished students of the college have been Vaughan Williams, Holst, Ireland, Bridge, Walford Davies, and Leopold Stokowski. Sir Hugh Allen was director from 1918 to 1937. He was succeeded by Sir George Dyson. The qualifications of the R. C. M. are considered distinctive, and the Associated Board of the R. C. M. and R. A. M. conducts local examinations ranging from elementary to advanced grades. Buildings were opened in Kensington in 1894, a concert hall being added in 1901.

Royal College of Organists, the central organisation in London of the profession of organist. It was originally founded on the initiative of R. D. Limpus, and incorporated by royal charter in 1893. Examinations are held in organ-playing and the theory of music, and diplomas granted for associateship and fellowship. There are also examinations in choir-training, and the college awards sev.

scholarships and prizes. Address: Kensington Gore, S.W.7.

Royal College of Physicians, incorporated medical body in London, founded by Thomas Linacre, who with the help of his friend, Cardinal Wolsey, obtained letters patent from Henry VIII. in 1518. The object of the society is to guard the profession from men 'who profess physic rather from avarice than in good faith to the damage of credulous people,' and its gov. is vested in the president and fellows only. Linacre was the first president (1518-24). The fellows are elected from the members of the college. The college first held its meetings in Linacre's house in Knight-riding Street, until it moved in 1614 to larger premises in Amen Corner. These were burnt down in the fire of 1666, and new buildings were opened in Warwick Lane in 1671. The college moved to its present site in Pall Mall in 1825. The R. C. of P. of Edinburgh, incorporated in 1681, has combined with the Royal College of Surgeons (Edinburgh) and the faculty of Physicians and Surgeons (Glasgow) in granting a triple qualification by a single examination. The college grants a diploma of L.R.C.P. and of M.R.C.P.

Royal College of Science, *see under* IMPERIAL COLLEGE OF SCIENCE AND TECHNOLOGY.

Royal College of Surgeons. The practice of surgery was in the Middle Ages chiefly in the hands of barbers, and in 1460 a company was incorporated to protect the interests of London barbers who practised as surgeons. In 1511 surgery was restricted by Act of Parliament to persons qualified to practise that art, and a Company of Surgeons arose who amalgamated with the Company of Barbers in 1540. In 1800 was estab. the R. C. of S. of London, which became reconstituted in 1813 as the R. C. of S. of England. The estab. of the General Medical Council in 1858 helped to regularise the two professions of physician and surgeon, and the work of the two colleges has from that time been co-ordinated. The college grants diplomas of membership (M.R.C.S.), jointly with the licentiatehip of the Royal College of Physicians, L.R.C.P., the two together constituting a legal registrable qualification to practise medicine and of fellowship (F.R.C.S., the hall mark of the successful surgeon), and a special licentiatehip in dental surgery. The building in Lincoln's Inn Fields, which possesses an excellent museum of anatomical specimens and other material cognate to the work of surgery, based on John Hunter's collection, was badly damaged during the Second World War. The R. C. of S. of Edinburgh was incorporated in 1505 and has buildings in Nicolson Street. In 1948 the degree of F.R.C.S. (Fellow of the Faculty of Anesthetics, Royal College of Surgeons) was instituted.

Royal Commission, *see* COMMISSION.

Royal Corps of Military Police, *see* MILITARY POLICE, ROYAL CORPS OF.

Royal Corps of Signals. Up to 1920, when this corps was formed, all arms of the Brit. service except the Royal Artil-

lery communicated by means of the signals service of the Royal Engineers. The R. C. of S. absorbed the Indian Signal Corps in 1927, and was completely mechanised by 1939. All communications between headquarters above regimental level are handled by detachments of the R. C. of S., whether by dispatch rider, telephone, radio, or teleprinter. *See also* SIGNALLING, *Military*.

Royal Courts of Justice, *see* JUSTICE, ROYAL COURTS OF.

Royal Dragoon Guards, 4th/7th, *see under* GUARDS, DRAGOON.

Royal Dragoons, The 1st, oldest line cavalry regiment in the Brit. service; raised in 1661 by the earl of Peterborough for service at Tangier, and known as 'Tangier Horse' (*see also* WEST SURREY, QUEEN'S OWN ROYAL). On returning from Tangier in 1684 it was regimented with other dragoons by Col. John Churchill, later the famous duke of Marlborough. The regiment served under William III. in Flanders and Ireland and again in the Low Countries; fought at Dettingen, 1743, where it captured the standard of Fr. Mousquetaires Noirs; and was in the Peninsula under Wellington and covered the army's withdrawal on Torres Vedras in 1810. The regiment distinguished itself at Waterloo and captured the Eagle (standard) of the 105th Fr. Line Regiment. It formed part of the Heavy Brigade that made the famous charge at Balaklava during the Crimean war. During the First World War the R. D. took part in the Ypres battles from 1914 to the end of the war. The regiment was still horsed in Sept. 1939. It was then part of the army stationed in Egypt and the Middle East, and, as an armoured car regiment, subsequently fought in all the battles from Alamain to Tunis.

Royal Dutch Shell, *see under* SHILL TRANSPORT AND TRADING COMPANY.

Royal East Kent Regiment, *see* BUFFS.

Royal Electrical and Mechanical Engineers. The greatly increased use, from 1916 onwards, of internal combustion engines and electrical gear by the army was not accompanied by the growth of a central organisation for the repair and overhaul of this equipment in the field. It led to a steady increase in the number of technical N.C.O.s, and other ranks such as fitters, motor mechanics, artificers, and armourers in fighting units for first-line repair work, and apportioning out of this work at rear echelons between the R.E., the R.A.S.C., and the R.A.O.C. (*see* separate articles). In 1942 this service was centralised and a new corps built up by drafts of 'craftsmen' (the lowest rank in the R.E.M.E.) from the specialist corps. To-day the R.A.S.C. retains its own motor repair service, but R.E.M.E. workshops (normally one for each brigade) repair weapons, vehicles, and technical equipment in use for fighting units, which also have attached to them light air detachments under the command of a W.O.2 from the R.E.M.E.

Royal Empire Society, Brit. organisation founded as the Royal Colonial Institute in 1868 to combat the separatist school,

to promote unity of the empire, to increase knowledge and mutual understanding of its many countries and peoples, and to provide a centre in London. The institute received its royal charter of incorporation in 1882 and, by its supplementary charter of 1922, following its absorption of or amalgamation with various other societies with objects resembling its own, its name was changed to the more comprehensive R. F. S. Its motto is 'United Empire,' and the qualification for membership is Brit. citizenship and an acceptance of the society's objects and policy. The membership numbered on Jan. 1, 1950, 26,055 fellows, associates, and companions. The society's imposing new home in Northumberland Avenue, London, erected to the design of Sir Herbert Baker, was opened in 1936. Every one of the public rooms was panelled and decorated and in part furnished with materials, especially timber provided by the govts of the dominions and the colonies, and by individual donors. During the air raids on London in the spring of 1941 the unique empire library lost 32,000 vols, some probably irreplaceable. The building contains, besides the library of more than 250,000 books and pamphlets, a bureau of information on matters relating to conditions and prospects in empire territories overseas, a newspaper room with a complete collection of the press from every part of the empire, an assembly hall in which are held regular meetings for addresses, discussions and cinema shows, and many other amenities. The jour. of the society is *United Empire*, published monthly. Local branches are estab. at Bath, Bournemouth, Bristol, Cambridge, Dover, Liverpool, and Oxford, and at Adelaide, Auckland, Brisbane, Christchurch (New Zealand), Colombo, Hobart, Jersey, Melbourne, Montreal, Sydney, and Wellington (New Zealand).

Royal Engineers, Corps of, see **ENGINEERS, CORPS OF ROYAL**

Royal Family, term used in Great Britain for the sovereign and members of his or her family. When the sovereign is a king the first person of the R. F. after the king is the queen who may be either regnant (when she has the same powers and prerogatives as a king), dowager (i.e. widow of deceased king), or consort. The life and chastity of the queen consort are protected by the Statute of Treasons, 1552. She has her own attorney- and solicitor-general, but though she pays no toll and cannot be amerced (fined) in any court she is the king's subject, and hence liable to criminal process, and can be guilty of treason against her own husband. She formerly held certain reservations out of the royal demesne lands, and a due called 'queen's gold' payable by any person in return for acts of royal grace extended to him. Apparently it is for the king to decide whether his consort shall be crowned or not; if she is to be crowned the archbishop of York performs the ceremony, which is, of course, separate from that of the king's coronation. On the king's death she becomes queen-dowager, and is

then outside the protection of the Statute of Treasons. But no one can marry her without the licence of the sovereign, and if she marry a subject she does not forfeit her royal dignity. A prince consort has no special privileges apart from those that may be specially granted by statute or letters patent. Both Philip II. and William III. enjoyed the title of king. Prince Albert was given precedence next to the queen and allowed to attend Privy Council meetings. The life of the king's eldest son is protected by the law of treason. At birth he becomes duke of Cornwall. When he succeeds to the throne the duchy of Cornwall vests in his eldest son. The king can, if he chooses, and always does, make his eldest son Prince of Wales and earl of Chester by letters patent, but other titles are *inheritable* by the heir apparent. The sovereign can control the custody and education of the children of his heir, and the custody of all princes and princesses of the blood royal except the issue of princesses who have married into R. F.s. Both the chastity and life of the Princess of Wales during marriage are protected by the Statute of Treasons. Princes and princesses of the blood royal take precedence of all peers and public officials (see **PRECEDENCE**). The king, queen, and certain members of the R. F. have a sum awarded to them, called the civil list (*q.v.*) in consideration of the king assigning to the nation his life interest in the hereditary revenues of the Crown.

Royal Flying Corps was formed on May 13, 1912, and developed out of the Air Battalion of the Royal Engineers formed on April 1, 1911, as the first step in creating a Brit. Army air arm. The air battalion, which was absorbed into the new corps, consisted of two companies, one dealing with airships, the other with aero planes. Similarly, the R. F. C. was divided into two wings (a naval wing and a military wing) and officers who were seconded to the corps retained their existing naval or military rank. The naval wing carried out flying training and experiments with seaplanes and airships, as well as with landplanes, while the military wing concentrated on landplanes only. In July 1914 the naval wing separated from the R. F. C. and became the Royal Naval Air Service, and on April 1, 1918, the R. F. C. and the R. N. A. S. (*q.v.*) merged to become the Royal Air Force. Among the army officers seconded to the R. F. C., on its formation was Maj. Hugh Trenchard of the Royal Scots Fusiliers (later marshal of the Royal Air Force Viscount Trenchard), who commanded the corps in France, with the rank of major-general, and who on the formation of the R. A. F. and the air ministry, became chief of the air staff, and is generally regarded as the 'father' of the R. A. F.

Royal Free Hospital, Gray's Inn Road, London, W. C. 1. General hospital for all type of illnesses and under the National Health Service designated as an undergraduate teaching hospital in association with the R. F. H. School of Medicine formerly the London School of Medicine for Women. The hospital was originally

founded in 1828 by Dr Wm Marsden, and incorporated by royal charter in 1892. The R F H group also includes the Elizabeth Garrett Anderson Hospital and the Hampstead General Hospital, as well as the former N W Fever Hospital and London Fever Hospital.

Royal Fusiliers (City of London Regiment), whose first dates from 1685, was raised in the time of Monmouth's rebellion. In its early years it was an ordnance corps charged with the duty of protecting the ordnance. Soon after its formation it received the designation of 7th (Royal Fusilier) Regiment of Foot which title it retained until the territorial reorganisation of the army in 1881 when the name was modified to its present form. Like the Rifle Brigade (q.v.) and a few other regiments it was one of the few line regiments which had four battalions or more than the customary two of the Cardwell linked system. In the First World War the regiment was augmented comprising besides many special reserve and service battalions over thirty affiliated territorial force battalions of the London Regiment. Like the Rifle Brigade and other large regiments the R F were represented in practically every important battle of the First World War. At Mons the 4th Battalion was conspicuous near Namur bridge, and again later in 1914 near Givenchy. In 1915 the service battalions fought with distinction at Hohenzollern Redoubt while the 2nd Battalion won honour at Suvla Bay in Gallipoli, at Beaurivault at Ovillers and especially at Delville Wood where a number of R F battalions were heavily engaged including the 3rd Public Schools Battalion which also fought in the Ypres area in 1917. Other battles in which the R F took part included Cambrai (Nov. 1917), Bapaume (Aug. 1918) and they also took part in the advance of Gen Allenby in Palestine in 1918. The regiment's most outstanding service in the Second World War was in Italy in 1943-44.

Royal Geographical Society, The, was founded in 1830 to advance geographical knowledge by exploration and research. In the nineteenth century it contributed to opening up Africa by supporting Livingstone, Speke and Grant (Ameron) and others and revived British interest in the Antarctic, sharing in the organisation of many expeditions from Capt Scott's to the present Norwegian-Brit-Swedish expedition to Queen Maud Land. The society also initiated the reform of geographical education in Britain including the establishment of the first university school of geography at Oxford in 1899. Two gold medals for outstanding work are awarded annually by His Majesty the King on the recommendation of the council which also makes grants and awards. The society is supported mainly by subscriptions and donations of fellows; it maintains also a library and a map room the latter open to the public, and publishes results of original research in the *Geographical Journal* and other publications. Its address is Kensington Gore, where there is a map room open to the public.

Royal Hampshire Regiment, see HAMPSHIRE REGIMENT

Royal Highlanders, see BLACK WATON
Royal Horse Guards, see HORSE GUARDS

Royal Hospital, institution in Chelsea for invalid soldiers which was opened in 1694. It is the most notable building of Chelsea and was built by Wren (1682-92) probably at the instigation of Charles II, although the actual founder was Sir Stephen Fox (1627-1716) who contributed £13,000 towards it. It stands in extensive grounds which include the former Stanclagh Gardens and is built of brick with stone quoins, cornices, door and window dressings being an excellent example of Wren's power to produce a monumental effect with simple materials. The hospital accommodates upwards of 500 men and a system of out-pensioning relieves large numbers throughout the empire.

Royal Household, see HOUSEHOLD
Royal

Royal Humane Society, The, see HUMANE

Royal Hussars, 10th (Prince of Wales's Own), were raised as dragoons in 1711 but were first in action against the Jacobites in 1743. Served in Germany in the Seven Years war. The Prince of Wales, who claimed they bear was their colonel in 1743 and became George IV. He also conferred the designation 'Royal' in 1811. They took part in the Peninsula campaign of 1808 and embarked at Corunna having shot all their surviving horses. From 1814 to 1818 they fought on the Continent mostly dismounted but at Amiens they made one of the rare cavalry charges of that campaign. Mechanised in 1939 they formed part of the 2nd Armoured Brigade and fought in France, North Africa and Italy. See also REGIMENTAL HUSSARS.

Royal Hussars, 13/18th (Queen Mary's Own) Both regiments amalgamated in 1922 were raised as dragoons the 13th in 1711 and the 18th in 1759. The latter were Light Dragoons from their formation, the former became so in 1783. Both regiments fought in the Peninsula and at Waterloo. The 13th were in the Light Brigade at Balaklava. Both regiments went to South Africa in 1899 and remained in that theatre until 1902 and both were engaged on the Western Front in the First World War. In 1916 the 13th was sent to Mesopotamia where it fought at Kut al Amara, Bagdad and elsewhere. The combined regiments were mechanised in 1933. See also HUSSAR REGIMENT.

Royal Hussars, the King's 15/19th The 15th Hussars (then Light Dragoons) were raised in 1759. The title 'The King's' was conferred in 1766 for services in Germany during the Seven Years war. During the Napoleonic wars they served in the Low Countries, the Peninsula and at Waterloo. The 19th Hussars were taken over from the old Bengal Army of the East India Company after the mutiny but also inherited the traditions and some of the battle honours of a previous 19th Light Dragoon regiment which had been

disbanded in 1822. They took part in the two Egyptian campaigns and the S African war. Both regiments served on the W front throughout the First World War. They were amalgamated in 1922 and mechanized in 1939. *See also* **HUSSARS, REGIMENT**.

Royal Inniskilling Dragoon Guards, the 5th, see under **GRAYS DRAGOON**.

Royal Inniskilling Fusiliers, see **IRISH KILLING FUSILIERS, THE ROYAL**.

Royal Institution of Great Britain, The, organisation for the promotion, diffusion, and extension of science and useful knowledge, founded in London 1799 incorporated by royal charter 1800 and enlarged 1910. In its laboratories F Young H Davy M Faraday J Tyndall J Dewar and others conducted their researches. The idea originated with Benjamin Thompson Count Rumford (d 1811) and was carried out with the help of Sir Joseph Banks (d 1820). There is a fine library a laboratory and a museum. Public lectures are given. There are four professorships of natural philosophy, chemistry, physiology and astronomy. Ludwig Mond endowed the Davy Faraday research laboratory in 1896.

Royal Institute of International Affairs, organisation for the study and discussion of international problems originating at the peace conference held in Paris in 1919 ended the first World War. The foundation was originally intended to comprise two branches which have however, since developed independently: the one into the Council of Foreign Relations in New York, the other into Chatham House, London. Between 1919 and 1936 Canada, Australia, New Zealand, S Africa, and India all established their own institutes of international affairs in close relation with that of Great Britain. Chatham House maintains not only a fine library of vols related to its sphere of interest but a unique collection of classified cuttings from the world's press accumulated since its foundation. The institute has sponsored individual works which have exercised a decisive influence upon policy, such as Lord Hailey's *An African Survey* (1938). But its most active life is in the frequent addresses always followed by discussion in the lecture room in Chatham House.

Royal Institution for the Preservation of Life from Shipwreck, see under **ROYAL**.

Royal Institution of Chartered Surveyors, see under **QUANTITY SURVEYING**.

Royal Irish Fusiliers, see **IRISH FUSILIERS, THE ROYAL**.

Royal Irish Hussars, 8th King's. Like the Inniskilling (old 6th) Dragoon Guards the R I H were raised from Protestant partisans of William III in his Irish war against James II (1693). They fought in the Sp campaign under Peterborough (1710). The title 'Royal Irish' was conferred in 1777. The regiment formed part of the Light Brigade at Balaklava, and fought in the S African war and on the W front in the first World War. Battle honours include Leuwarde (1803), Somme, Cambrai, and Bapaume. *See also* **HUSSARS, REGIMENT**.

Royal Irish Regiment, see **IRISH REGIMENT, THE ROYAL**.

Royalists, term frequently used of monarchist parties in England. It is applied especially to the party which supported Charles I and after 1649 Charles II during the civil wars. The R appear as a distinct group in Parliament during the Root and Branch debates on episcopacy in the House of Commons in 1641. A strong minority emerged who though generally opposed to Arminianism were also opposed to the eradication of episcopacy from Anglicanism. As the war progressed it was obvious that the R were strongest in the N W and the Parliamentarians in the S E though there were few exceptions to this such as Royalist Colchester in the S E and Parliamentarian Gloucester in the W. R were drawn from all classes though their standard support came from the lesser gentry. They embraced a wide range of religious opinions. Catholics and Arminians were universally Royalist but the party included moderate Anglicans and, after 1649, many Presbyterians and some of the sectaries. This diverse group was, in fact, welded together by its allegiance to the king alone. One of the best explanations as to what constituted a Royalist was given by Sir Edmund Verney who fell during the royal standard at Newbury. On the constitutional questions and the scope of issue his sympathies were really with the Parliamentarians. He supported Charles I however for he declared that having enjoyed the king's favour and kindness for many years he could not be so base as to desert him now. *See* I Hyde I and Clarendon *State Papers* 1621 onwards. Lord Clarendon *History of the Rebellion and Civil Wars in England* 1702. A G Aikin *History of My Own Times* 1723 1731 (ed O. Ainslie, 1897 1900). *Verney Papers* ed by Francis P and Margaret M Verney, 1892 99, W A Shaw *History of the English Church during the Civil War* 1900. C Davies, *The Early Stuarts* 1937. H T Trevor Roper *Archbishop Laud* 1940 and D Mathew, *Sexual Structure in Caroline England* 1918. *See also* **WAR, CIVIL**.

Royal Lancers, 12th. This regiment was raised as dragoons for the 171 rebellion. It was not again in action until 1793. The duke of Wellington served in the regiment as a lieutenant from 1789 to 1791. During the Napoleonic wars it served in Egypt the Peninsula and at Waterloo, which is its earliest battle honours. It was put of the Light Brigade at Balaklava and fought in the S African war and on the W front in 1914. With the 11th Hussars it was the first cavalry regiment to be converted to armoured cars (1928). They went to France in 1939 and to the W desert in 1941. They fought throughout the N African campaign and in Italy in 1944 and 1945. *See also* **LANCERS, REGIMENT**.

Royal Lancers, Queen's 9th. Raised (as Wynn's Dragoons) to put down the Old Pretender's rising in 1715. Became 9th Dragoons in 1719. The queen from whom they take their title was Adelaide, consort

of William IV. During seventeen years' continuous service in India, which included the mutiny, the 9th Lancers won fourteen V.C.s. They fought in the Afghan war of 1875 and throughout the S. African war. They formed part of the original B.K.F. (q.v.) in 1914, and were engaged at Mons. They were converted to light tanks in 1935. In 1940 they arrived in France in time to take part in the campaign, were evacuated, re-equipped, and went to the W. desert in 1941. Also fought in the It. campaign from May 1944 onwards. *See also* LANCERS; REGIMENT.

Royal Leicestershire Regiment. *see* LEICESTERSHIRE REGIMENT.

Royal Lincolnshire Regiment. *see* LINCOLNSHIRE REGIMENT.

Royal Mail Lines, Ltd., incorporated as the Royal Mail Steam Packet Company in 1839 by a charter to carry mails to the W. Indies, and entered into the first contract with the gov. in 1841. The company was also the first to institute mail communication with S. America in 1851. In 1909 the Forward line was purchased, and in 1910 the whole of the share capital of the Pacific Steam Navigation Company. Under reorganisation in 1932 the fleets of the Nelson Steam Navigation Company and David MacIver & Company Ltd. were transferred to the Royal Mail Company. The main services are to S. America, Central America and W. Indies, and N. Pacific coast.

Royal Marines. *see* MARINES.

Royal Marriages. By the Royal Marriage Act, 1772, which was passed by reason of the marriage of the then duke of Cumberland with Mrs. Horton, and of the duke of Gloucester with Lady Waldegrave, no descendant of George II. other than the issue of princesses who have married into foreign families may lawfully marry without the consent of the sovereign signified under the great seal and declared in council. Marriages contracted without such consent are void wherever contracted or solemnised, and any person solemnising or consenting to such marriages incurs the penalties of præmunire (which penalties now involve no more than inability to sue for any private injury). It seems, however, that a descendant of George II. over twenty-five years of age may marry without the royal consent on giving twelve months' notice to the Privy Council, provided Parliament in the interim makes no objection. *See also* MORGANATIC MARRIAGE.

Royal Military Academy. *see* SANDHURST. *See also* under MILITARY EDUCATION and MILITARY SCHOOLS.

Royal Military Asylum. *see* DUKE OF YORK'S SCHOOL.

Royal Mint. *see* MINT.

Royal National Lifeboat Institution. *see* under LIFEBOATS.

Royal Naval Air Service, developed out of the naval wing of the Royal Flying Corps and came into being on July 1, 1914. Its prin. duties were patrolling sea routes and attacking Zeppelin sheds, and particular exploits included the destruction of two Zeppelins at Düsseldorf and

Friedrichshaven (1914), the sinking of three ships in the Dardanelles by torpedoes launched from seaplanes, offensives against enemy bases in Belgium, further successful attacks on Zeppelins and sheds, bombing raids on Pola, Cattaro, Durazzo, and Constantinople. It also performed valuable anti-submarine work, and in addition operated scout airships, fifteen armoured car squadrons, and three armoured trains. By 1915 it possessed 2949 aircraft and ninety airships. The R.N.A.S. was amalgamated with the R.F.C. to form the R.A.F. on April 1, 1918, and was revived as the Fleet Air Arm (q.v.) in 1924.

Royal Naval College. *see* under NAVAL EDUCATION.

Royal Naval Division, formed in Aug. 1914, consisting of one R.M. and two R.N. brigades of approximately 3500 men each. Later were included R.N.R., R.F.R., and R.N.V.R. personnel for whom no ships were available. Originally it was intended to assist home defence in the early stages. The div. saw service in the defence of Antwerp (1914), Gallipoli (1915-16), and on the W. front (1916-18), and distinguished itself for tenacity and courage at Beaumont (Nov. 1916), Gavrelle (April 1917), Passchendaele (Oct. 1917), in the tier. offensive of March 1918 and in the subsequent allied advance. While in France it was brought up to strength mainly by recruits from army sources. The R.N.D. suffered 32,631 casualties, which amounted to over 163 per cent of the average numbers carried. It was disbanded in 1919.

Royal Naval Reserves. *see* under NAVAL RESERVES.

Royal Naval Scientific Service. *see* NAVAL SCIENTIFIC SERVICE, ROYAL.

Royal Navy. *see* NAVY AND NAVALS.

Royal New Zealand Air Force. This was estab. in 1925, its foundation being two squadrons of fighter planes lent by the R.A.F. During the Second World War it reached a peak enlistment of 52,000. Its squadrons served on all major fronts. It is controlled by an Air Board under the chairmanship of the minister of defence.

Royal New Zealand Navy. Unit formed in 1941. Previously a R.N. squadron had been stationed in New Zealand waters, its cost being shared by the Brit. and New Zealand Govs. For its part in the Second World War *see* under NEW ZEALAND, Defence.

Royal Niger Constabulary. *see* under WEST AFRICAN FRONTIER FORCE.

Royal Norfolk Regiment. *see* NORFOLK REGIMENT.

Royal Northumberland Fusiliers. *see* NORTHUMBERLAND FUSILIERS, ROYAL.

Royal Numismatic Society. Founded in 1836 as the Numismatic Society of London, the society was granted its royal charter in 1904 for the study of all branches of coins and medals (*see* NUMISMATICS; MEDALS), and now applies itself with equal emphasis to the Gk., Rom., Eng., Brit. Im., Ital., continental, and oriental series. In 1836 the *Numismatic Journal* was first pub.; in 1838 this was renamed the *Numismatic Chronicle*, which has been in pub. ever since. The society

meets monthly in London for the transaction of its business and to hear papers read by its fellows. Fellowship is open to all with good amateur interest in numismatics. An annular silver medal is awarded for work of outstanding merit at home or abroad. Address: Brit. Museum.

Royal Observer Corps, see OBSERVER CORPS, ROYAL.

Royal Opera House, see COVENT GARDEN THEATRE.

Royal Physical Society of Edinburgh, instituted in 1771 and incorporated in 1788. It is exclusively devoted to natural history and the physical sciences. With it were merged a number of other societies such as the Chirurgus medical, Hibernian Medical, Chemical, Natural History and Didactic, all between 1796 and 1813. The society's first *Proceedings* were issued in 1858.

Royal Pioneer Corps. The term 'pioneer' is a fairly ancient one in English military phraseology, where it is more or less interchangeable with the modern English term 'engineer' in its military sense of sapper and miner. In many foreign armies (e.g. German) troops which in England are called engineers are called pioneers. The employment of pioneers was not only in siege warfare but on the move on lines of communication where their task was to build and maintain roads and bridges. This task was sometimes entrusted to second line infantry (elderly slightly unfit or lightly armed troops) and from 1914 to 1918 every British division had a battalion of such troops which was raised from an infantry depot permanently employed in digging and repairing trenches in rear of the main defence system, hence their generic name of 'navvy battalions'. Work on roads and bridges was mainly entrusted to labour battalions and companies often of colonial or Asiatic origin, e.g. the Chinese Labour Corps. In Oct. 1939 about fifty labour companies existed and were formed into the Auxiliary Military Pioneer Corps which became the Pioneer Corps in 1940 and the Royal Pioneer Corps in 1946. By the end of the war the corps had a strength of over 250,000 including such diverse elements as cobelligerents, its and companies of British subjects from Mauritius and native companies from Bechuanaland, Basutoland, Swaziland and Zululand.

Other pioneers in the older military sense forming part of regiments of infantry and engaged in clearing the way for the advancing troops are now represented by the pioneer platoon of the support company in an infantry battalion whose prime task is to remove or disarm wire and mines in the assault or pursuit.

Royal Regiment, The, see under ROYAL SCOTS, THE.

Royal Regiment of Artillery (see also ARTILLERY). Permanent units of field artillery were not maintained in the British service until 1711, though permanent garrisons of artillery had been kept up since Tudor times. Militia units of garrison artillery were known as 'fencibles'. The Royal Regiment was formed in 1722. It was at first organised in companies,

later known as batteries. Batteries were grouped in brigades until 1938, when the tactical unit became the regiment. Until after the First World War units were designated as the Battery, Royal Field Artillery or Royal Garrison Artillery.

Now the whole regiment is divided into two main branches: Field and Anti-Tank and Coast and Anti-Aircraft. To the former belong the Royal Horse Artillery and the much older Honourable Artillery Company (q.v.)—so far as its artillery batteries are concerned. The Maritime Regiment RA belongs to the latter.

Royal Sanitary Institute, founded in 1876. Its object is to promote the advancement of sanitary science in all or any of its branches and the diffusion of knowledge relating thereto. It has a membership of over 8000 which includes members of the medical, engineering, architectural, veterinary, legal and other professions associated with public health.

Royal School, Bath, founded in 1664 for the education of daughters and granddaughters of army or Royal Marine officers who have held or hold permanent regular commissions and daughters of former pupils. There is accommodation for 246 boarders between the ages of ten and eighteen. The official title of the school is Royal School for Daughters of Officers of the Army.

Royal Scots, The, The Royal Regiment (Lothian Regiment), senior line regiment of the British Army and probably the only surviving regiment in any European army having a direct connection with the professional companies as opposed to feudal levies of the late Middle Ages. From the early fifteenth century the kings maintained large numbers of Scottish troops and their number was greatly augmented under Henry IV. When in 1633 Charles I of England and Scotland decided to intervene in the Thirty Years War he granted a warrant to Sir John Hepburn to raise men in Scotland for a regiment to be formed round a cadre drawn from the Scottish regiments still in the service of the Crown. Hepburn claimed precedence for the regiment and one of the senior Irish regiments named it 'Pontius Pilatus Bodyguard'. After the death of Gustavus Adolphus the Scottish regiments in the Swedish service were disbanded and those members of the thirteen Swedish-Scottish regiments who did not take service under sundry German potentates joined Hepburn's colours. This brought the regiment up to a strength of over 3000 or about three times the size of a normal regiment of those days (1633).

The title of Royal Regiment of Foot was conferred upon it for services in Flanders in 1680. Dismanded Oudenarde and conferred upon it for services in Languedoc in 1686. Dismanded Oudenarde and Xprie in the sixteenth century are among the historic sieges in which it took part. Its battle honours before the First World War include also Ava, the Crimean battles of Peking (1860), Taku Forts and the African War. It was transferred from the

Scottish estab. in 1914. In the 1914-18 War thirty-eight battalions served the 2nd Battalion was at Mons and Le Catcau in 1914. Six battalions took part in the Somme and Amiens battles in 1916. Other battalions fought in the Brit. advance into Palestine in 1917 and against the final Ger. offensive in 1918. In the Second World War the 1st Battalion went to the W. front in 1939 and distinguished itself in the rearguard fighting across France, the remnants being evacuated at Dunkirk. Other units including the 10thians and Border Horse a yeomanry regiment which was converted into a R.S. battalion fought on the It. front in the battle of Normandy and in the advance to and across the Rhine. The 1st Battalion sailed in 1942 for India. In Burma it was blown into Kohima to assist in repelling the Jap. advance in Assam. It incurred serious losses but later crossed the Hindwin R. at Kalewa and moved on through Shwabo to the Irrawaddy R. and on to the siege of Mandalay.

Royal Scots Greys see **GRAYS SCOTS**

Royal Society for the Prevention of Accidents, see **under ROAD SAFETY**

Royal Society for the Protection of Birds, founded in 1889 and incorporated under royal charter in 1901. The society is the national body responsible for the conservation of Brit. birds, more especially the rarer species. It maintains active liaison with regional bodies. It owns or administers a number of sanctuaries, such as Grassholm, Minsteric and Hovkate Is. It also employs a chain of paid watchers from Cornwall to Shetland. The society is also actively engaged in educating the younger generation into a fuller appreciation of the value of wild life. The Junior Bird Recorders Club, formed by the society in 1943 to cater for young bird watchers, now numbers over 2000 members. The society publishes a quarterly magazine *Bird Notes* and booklets and leaflets. Membership of the society is open to all persons in sympathy with its objects.

Royal Society of Arts (Royal Society for the Encouragement of Arts, Manufacture and Commerce) learned society founded in London in 1754. Its scope includes all the practical arts and sciences and the membership (1950) is 5300 fellows. The chief regular activities are the delivery of lectures (afterwards pub. in a fortnightly journal) on a wide range of subjects and the conduct of a large system of commercial examinations, but the society's list includes many pioneering efforts such as the first Eng. exhibition of contemporary art (1760) which resulted in the foundation of the Royal Academy, the first industrial exhibition (1761) the inauguration of the first international exhibition (1851) and the foundation of the National Training School for Music (1870). In the eighteenth century far-reaching results were achieved in agriculture, forestry and mechanical invention, both in Britain and the colonies, by the award of prizes. The society's chief special interest is industrial design, which it fosters by exhibitions (such as the

Exhibition of Brit. Art in Industry 1935, held jointly with the Royal Academy) competitions and the award of the distinction of Royal Designer for Industry (R.D.I.) to eminent designers. The patron is His Majesty the King and the president is Princess Elizabeth.

Royal Society of Edinburgh (founded 1783) Scottish learned society arose from the Philosophical Society of Edinburgh founded in 1731. It received a charter in 1783 and a second in 1811. The society was instituted for the promotion of science and literature but deals now almost wholly with science. It has a membership of approximately 770 fellows and a maximum of 22 Brit. honorary fellows and 44 foreign honorary fellows. The society has pub. its *Transactions* since 1783 and its *Proceedings* since 1832. For fuller hist. see index vols of *Transactions* and also in *Proceedings* vol. v 1862 pp. 2-31.

Royal Society of London for Improving Natural Knowledge (generally known as the **Royal Society**), the oldest scientific society in Great Britain and one of the oldest in Europe. The nucleus of the society came into existence about 1645 but in Nov. 1660 the first jour. is recorded and in 1662 King Charles II, who had previously become a member, granted the first charter. Subsequent charters in 1663 and 1669 conferred further privileges on the society which numbered fifty-five members at its inception. The origin of the society is to be found in a group of enthusiasts for the new experimental philosophy who were for gathering like a similar group in France, and like them living down theological and political suspicion though political and religious topics were excluded from their weekly meetings for some time. Among these early associates were John Wilkins, afterwards bishop of Chester, Seth Ward, afterwards bishop of Salisbury, Christopher Wren, prof. of astronomy at Oxford, but later and far better known as England's greatest architect and Robert Boyle, author of the *Sceptical Chemist* and, soon afterwards, the band included men like John Evelyn and Henry the diarists. Wren was one of the new society's earliest presidents. Newton was elected a fellow in 1671 and in 1687 his *Principia* was pub. with the encouragement of the society. He soon became the central figure and served as president from 1703 until his death in 1727. He was succeeded by Sir Hans Sloane, whose collections formed the nucleus of the Brit. Museum. It was not until 1818 that the control of the society's affairs passed wholly into the hands of men of science and election into its full whship became a recognition of their high achievement. At the regular meetings at Burlington House scientific papers are read which are subsequently pub. in the *Proceedings* (dating back to 1800) or the *Philosophical Transactions* (which began in 1665) of the society. The administration of an ann. sum of £4000, granted by the gov. to promote scientific research, is in the society's hands, it also awards annually the Copley,

two Royal, the Davy, and the Hughes medals, the Rumford and Darwin medals every second year, the Sylvester every third, and the Buchanan medal every fifth year. The number of fellows of the society is 500, and fifty foreign members. See C. R. Weld, *A History of the Royal Society*, 1848, and Sir H. Lyons, *The Royal Society*, 1941.

Royal Succession, see SETTLEMENT, ACTS OF and SUCCESSION, ROYAL.

Royal Sussex Regiment, see SUSSEX REGIMENT, THE ROYAL.

Royal Tank Regiment. The first Brit. tank crews were known, for security reasons, as the Heavy Bianchi, Machine Gun Corps, and in 1917 became the Tank Corps, in 1923 the Royal Tank Corps, and in 1939 the Royal Tank Regiment (see also ARMOURD CORPS, ROYAL). Within the R.A.C. sev. regiments of the R. T. R. survive as distinct from converted cavalry regiments. Generally speaking the tradition of heavy 'infantry' tanks remains with the R. T. R., and its units are commonly found in army tank brigades rather than in the armoured brigades of armoured divs. (see also TANKS)

Royalty. Popularly it is synonymous with monarchy or sovereignty, and a king is styled monarch or sovereign irrespective of the fact that he may possess no more than a portion of the sovereign power in a state. R. properly denotes the status of a person of royal rank, such as a king, queen, reigning prince, or grand duke, or any of their kindred. But the possession of such status is in no way expressive either of the actual or *de jure* political powers with which the possessor may be invested. The powers possessed by persons of royal dignity have varied from the performance of purely honorary functions to the exercise of the most absolute autocracy. See further under CROWN; SOVEREIGNTY.

Royal Ulster Constabulary, police force of N. Ireland. In 1797 the first police force in Ireland was formed under warrant of the lord lieutenant. Co. grand juries were authorised to appoint a chief constable to each barony, and were given power to enrol sixteen sub-constables to assist each chief constable. In 1822 under an Act of Imperial Parliament in the reign of George IV., a permanent trained police force was set up for the whole of Ireland, commanded by four inspector-generals, one for each prov. In 1836 control of the four prov. forces was centralised under one inspector-general with headquarters in Dublin. In 1867 Queen Victoria granted to the force the title of the Royal Irish Constabulary. That force remained in being until disbanded under the Constabulary of Ireland Act, 1922, following the div. of the country into N. Ireland and S. Ireland (Eire). The R. U. C. came into being on June 1, 1922, under a Constabulary Act passed by the first Parliament of N. Ireland. Approximately one-half of the original estab. were members of the Royal Irish Constabulary, who transferred to the new force on disbandment. The R. U. C. has a maximum strength of 3000, and is commanded by an

inspector-general, assisted by a deputy inspector-general, with headquarters in Waring Street, Belfast. The regular police force is assisted by a part-time voluntary force of special constables, known as the Ulster Special Constabulary.

Royal Ulster Rifles, see IRISH RIFLES, THE ROYAL.

Royal Warwickshire Regiment, see WARWICKSHIRE REGIMENT, THE ROYAL.

Royal Water Lily, see VICTORIA REGIA.

Royal West African Frontier Force, see WEST AFRICAN.

Royal Welch Fusiliers, see WELSH FUSILIERS.

Royan, seaport of Charente-Maritime dept., France, on the Gironde (N.), 20 m. from Saintes. It was a Huguenot stronghold. There are naval ironworks and sardine fisheries. It is a sea resort. It was seriously damaged during fighting in April 1941, being a centre of resistance in the Gironde. Pop. 9300. See further under WISHING FRONT IN ELZOND WORLD WAR.

Royat, tn. of Puy-de-Dôme dept., France, 2 m. W.S.W. of Clermont-Ferrand. It has an old church (eleventh to twelfth century) and mineral springs. It is a popular pleasure resort. Pop. 2300.

Royce, Frederick Henry, see under ROYLS-ROYCE LTD.

Royce, Josiah (1855-1916), Amer. philosopher, b. at Grass Valley, California, U.S.A. He graduated from the Univ. of California, and studied philosophy in Leipzig and Göttingen Univs. He held the chair of philosophy at his own univ., and then became a prof. at Harvard Univ. in 1892. As such he established himself as one of the foremost Amer. philosophers, influenced by Hegel in his objective idealism. His books include *Spirit of Modern Philosophy* (1892); *The Conception of God* (1895), and *The Conception of Immortality* (1900).

Royden, Agnes Maude (b. 1876), Brit. preacher and social worker, b. at Birkenhead and educated at Cheltenham Ladies' College and Lady Margaret Hall, Oxford. She did social work in Liverpool and elsewhere and worked for the women's suffrage movement. Though an Anglican, she was assistant minister of the City Temple from 1917 to 1920. With Percy Dearmer she founded the Fellowship Service at Kensington. Her pubs. include *Prayer as a Force* (1922); *The Church and Woman* (1924), and *I Believe in God* (1927). She pub. her autobiography, *The Threefold Cord*, in 1947. She was created C.H. in 1930.

Royde-Smith, Naomi Gwladys, Brit. novelist, critic, and playwright, b. at Liverpool, and educated at Clapham High School and Geneva. From 1912 until 1922 she was literary editor of the *Westminster Gazette*, and later did reviewing and dramatic criticisms. Her first novel, *Children in the Wood*, was pub. in 1928, her first play, *A Balcony*, in 1928. Since then her pubs. include eighteen long novels, and biographical studies of Mrs. Siddons and Mlle de Lespinasse. Her novels are remarkable for their characterisation, especially of sensitive characters.

Royer-Collard, Pierre Paul (1763-1845), fr. philosopher and statesman b at Compiègne Marne He was a member of the municipal council of Paris at the beginning of the revolution fled from Paris during the Reign of Terror and served on the Council of Five Hundred for a short time in 1797 In 1811 he was created prof. of philosophy at Paris teaching the doctrines of Lacl and Stewart and originating the *doctrinaire* school which included among its disciples Jouffroy Guizot (Camille Jordan P J H de Serre De Remusat Cousin etc) He was president of the Chamber of Representatives in 1828 presenting the address in 1830 which the king refused to hear See life by Barante 1878

Royston, mkt tn and urb dist in Hertfordshire England 13 m SSW of Cambridge situated on the pike Rom lock mead Way There is a thirteenth century church A curiosity is the R Cavo (near the post office) discovered in 1742, it dates from pre-Christian times and was a Roman sepulchre and an oratory It is dug out of the chalk (height 25 ft and diameter 17 ft) and contains rough figures and coloured reliefs of saints kings, and queens of various dates, most of which were made about 1000 of the crusades Thorfield Heath to the SW of the tn is a rolling heathland of 416 ac open to the public here golf and other games are played Hunting and coursing take place in the season Pop 4600

Royston, tn in Lancashire England 2 m N of Oldham It is engaged in cotton spinning Pop 14 900

RSFSR, see RUSSIAN SOVIET FEDERATIVE SOCIALIST REPUBLIC, and under RUSSIA

Ruabon, or **Rhiwabon**, tn in Denbighshire Wales 5 m SSW of Wrexham Coal and iron ore found here and there are brick and chemical works Pop 4000

Ruanda-Urundi, dist of the Belgian Congo assigned to Belgium as a manditory of the League of Nations It lies E of Mt Kivu and is bounded N by Uganda and E by Tanganyika It formed until 1919 a part of Ger E Africa It was united administratively with the Belgian Congo in 1925 It is a mountainous area volcanic in the N and is very rich in cattle Usumbura is the cap The dist covers 20 550 sq m and has a pop of 1 934 000 belonging to the Bakutsi, Bahutu, and Batwa tribes

Ruapehu, c 9100 ft volcano in North Is New Zealand It was in eruption in 1895 and 1945

Ruatan, see ROATAN

Rubasse, mineral (consisting of quartz or rock crystal, containing minute particles of red oxide of iron) The stone is valued for ornamental uses and is very rare An artificial variety is prepared by plunging red-hot quartz into a coloured liquid

Rubato (It 'robbed') manner of performing music without adhering strictly to time Various rules have been established at different times, eg that what is taken away by hurrying from the time properly occupied by a composition as written,

must be given back elsewhere by slackening or that in pianoforte music the right hand only may play R while the left keeps strict time, but R should be subject not to rules but to feeling, and it cannot be taught to those who have either no sense or an exaggerated notion of it

Rubber (**Indiarubber**, **Caoutchouc**) R latex is the milk like juice which is contained in numerous species of trees, shrubs, and plants and consists of R hydrocarbon together with varying amounts of other substances depending on source, in a dispersion in water This latex can be coagulated and dried in various ways to give the raw R of commerce It is called R because one of its earliest uses in Europe was erasing pencil marks and India from Julius the old Sp name for S America (about 1600) is derived from the Caribbean word *cahuchu* It is said that Columbus found the natives of Haiti playing with a ball made of the gum of a tree, that was lighter and bounced better than any known at home

Before the beginning of the *Hevea brasiliensis* R plantation industry, and during the Second World War very large amounts of R were extracted from many different sources both in plantations and in a wild state in jungles The most important source was trees *Ficus* *guayule*, which occurs in the Gold Coast and other parts of Africa *Landolphia* vines of several species which occur in many parts of Africa, *Manihot* from the Ceara prov of Brazil and some others as well as the *H brasiliensis* from the Amazon dist of Brazil The prin shrub was the guayule, which grows principally in Mexico but which has also been grown in plantations in the U S A Various plants including the common dandelion, also contain small amounts of R latex, and the *kok saghyz* or Russian dandelion was grown in the U S R, and experimentally in the U S A during the Second World War for its R content

Nowadays the chief source of R is the *H brasiliensis* tree, grown on plantations (both large European managed estates and native smallholdings) in Malaya Ceylon the Dutch E Indies and other places in the Far E These supplied 98.7 per cent of all natural R produced in 1940 The R produced from other sources though chemically identical suffers from several disadvantages eg the tree must be felled to extract the latex the latex exists in systems which contain a high percentage of resin which contaminates the R when coagulated or the R is produced under native conditions and is contaminated with grit bark and water, as is the case with all wild R In the case of *guayule* the whole plant minus the roots and in the case of *kok saghyz* the roots have to be treated by mechanical means in order to extract the R from the plant tissue In the case of *H brasiliensis* and some other trees the latex is merely contained in special tubes in the bark and can be obtained by tapping the tree ie making an incision in the bark, whence a small quantity of latex flows

HISTORY OF COMMERCIAL RUBBER GROWING—Although known in S. America from early times and mentioned in writings by Sp. travellers in the sixteenth century, R. did not begin to reach Europe and the U.S.A. in quantity until the early nineteenth century, coming at first solely from the Amazonas prov. of Brazil. Brazil exported 31 tons in 1837, and 2378 tons in 1853 in which latter year 247 tons were also produced by other countries. All this was 'wild' R., obtained from trees in jungles. Wild R. continued to be a major source of supply until about 1911, when it accounted for some 33 per cent (74,000 tons). The total amount of R. produced has risen enormously, e.g. in 1940 the U.S.A. alone imported 499,616

sew reasons the *H. brasiliensis* was found to be best, and Ceylon Malaya, and the Dutch E. Indies, and to a much lesser extent other places in the Far E. and Africa the most suitable places for growing it. They were more suitable even than the Amazon dist. of Brazil where plantations of *H. brasiliensis* were established where the trees were attacked and large numbers destroyed by a leaf disease.

The species can be raised from seed but bud grafting on to a young seedling is now preferred. The buds are taken from selected high yielding trees and in this way the characteristics of the 'mother tree' can be transmitted to an almost unlimited number of trees. The family of trees produced from one bud parent is called a 'clone'. When finally set out in the field there are usually about 140 trees per acre. The tree grows to a height of 100 ft. and has a diameter when fully grown of about 36 in. An intercrop of some kind is necessary between the trees especially with young trees and on hilly ground to prevent soil erosion under the tropical conditions. The trees are not tapped until they are some five to six years old. In tapping the cut is made deep enough to sever the latex tubes but not to damage the cambium, a paper like skin between the bark and the wood. Many types of cut have been used in tapping. Perhaps the most popular is a slightly sloping cut made half way round the circumference of the tree. Tapping is done on alternate days and in the early morning as the flow of latex is then greatest. The yield of latex varies from tree to tree and according to the age of the tree, the climatic conditions and other factors. About 1½ oz. of latex per tree per tapping is an average figure. It produces about 600 gallons per acre per annum. This has been much exceeded with special clones. The bark which is cut away in tapping is gradually renewed, this taking from six to ten years. If left in the natural state for any length of time the latex coagulates naturally and becomes putrid. A little sodium sulphite may be added to the collecting cups to prevent premature coagulation.

The latex is collected and transported to central bulking stations. It varies somewhat in R. content and as coagulation takes place more uniformly in dilute solutions it is diluted to a standard sp. gr. proportional to R. content. It is then ready to be made into smoked sheet or pale crêpe. If smoked sheet is to be made acetic acid is added immediately. This causes coagulation, the milky liquid setting to a junket like mass. The coagulation is usually carried out in partitioned tanks, so that the coagulum is obtained in strips 4 ft. by 1 ft. by 1½ in. thick. The coagulum is removed and squeezed between a series of rollers to consolidate into sheets and to remove water. The final sheet is about ½ in. thick. It is then allowed to air dry for a few hours and then hung up in special heated sheds filled with smoke from burning timber. The presence of smoke both aids quick drying and prevents fungus attacking the R. When



Camera Press

RUBBER TAPPING

The latex in spite of minor coagulation on the external bark of the tree runs down in the form of drops into the cup below. Each dot on the tapped portion represents one month's tapping.

tons of natural R. The amount used and the price of R. have varied very considerably over the last twenty years.

The plantation R. industry was effectively begun in 1876, when Sir Henry Wickham smuggled out of Brazil seeds of the *H. brasiliensis* which he had gathered on the Tapajos Madiera plateau, the export of all R. seeds and plants was forbidden by the Brazilian Gov. at that time. These seeds produced 2700 plants at Kew Gardens in London of which 1919 were transferred to Ceylon in 1876, all the R. trees on the vast plantations in Asia sprang from these. Once the advantages of growing R. on plantations were recognised other species of trees were tried, both in the Far E. and in Africa, but for

dry, in about ten days the R is baled and is then ready for shipment.

If pale crêpe is to be made sodium bisulphite is first added to the latex to prevent surface oxidation. When subsequently coagulated the latex thus retains its characteristic white to light yellow colour. Coagulation and squeezing are the same as for smoked sheet, except that stronger machinery is required as the R is eventually rolled out to about 0.04 in thick. The thickness required for pale crêpe is made by pressing thin layers together when warmed. In this way a smooth surface is obtained.

The latex which naturally coagulates on the tree which spills on the ground or which is contaminated in any other way is treated in various ways and sold as off quality R. A large amount of preserved latex is now also exported. In this case gaseous ammonia is added to the bulked latex to prevent putrefaction and coagulation. This latex is then either shipped direct or concentrated to remove part of the water content by centrifuging, creaming or evaporating before shipment.

CHEMISTRY OF RUBBER—Latex from *H. brasiliensis* consists of about 36 per cent solids in a water dispersion. Approximately 91 per cent of the solids is R, hydrocarbon, the rest being mineral matter, resins and proteins. Small amounts of many other organic substances have been identified in latex. Coagulated and dried R (both smoked sheet and crêpe) also contains about 91 per cent R, hydrocarbon. R, hydrocarbon is polymerised isoprene (C_5H_8) with a straight chain structure.

R is dissolved by benzene, carbon tetrachloride, and many other solvents. It undergoes all the reactions typical of a highly unsaturated organic chemical and it combines with hydrochloric acid to give a plastic material (pliolite) which is extensively used for packing foods. R reacts with sulphuric acid to give balata-like materials which are used for bonding R to metal.

By far the most important chemical reaction of R is that of R with sulphur. This reaction has come to be called vulcanisation. The importance of this reaction lies in the fact that although under certain conditions raw R is tough and elastic it becomes very hard in winter and soft and sticky at summer temps. In the early nineteenth century both Europeans and Americans found raw R suitable for making waterproof overshoes and other articles and as a solution in turpentine suitable for waterproofing cloth. These articles all suffered from the disadvantages above mentioned. Many attempts were made to overcome this thermal instability. For example, Macintosh in Glasgow put a R layer between two layers of cloth to produce the Macintosh raincoat. This overcame the difficulty in some measure. Positive success was obtained by Goodyear in America, who found that an intimate mixture of R and sulphur when heated for some time gave a material which maintained its flexibility at much lower temps and

did not become sticky in summer. Hancock in London also discovered this effect with the help of some samples from America and gave the reaction the now accepted name of vulcanisation. It was found that the product obtained depended on the amount of sulphur added and the time of heating. Addition of 8 to 10 per cent sulphur gave a soft flexible product while 30 to 40 per cent gave a hard brittle material (vulcanite), after suitable heating. This reaction with sulphur is the basis of nearly all the goods manufactured. The reactions are adhesive type reactions where a permanent stickiness is required and pure crêpe soles. Very thin articles can be vulcanised by sulphur chloride using either a solution of this in carbon disulphide or some other solvent, or sulphur chloride vapour in a heated chamber. There are the collench and vapour cure methods of vulcanisation. A relatively few other substances including selenium, tellurium and certain organic chemicals give a product similar to the R sulphur reaction product. The vulcanisation with sulphur can be modified by the accelerators, activators etc. (see below).

Vulcanisation is not reversible and devulcanised R has never been made. Vulcanised R scrap is however reclaimed on a very large scale. This is done by heating it up vulcanised scrap R with oils at high temps and in other ways. Scrap containing fabric (e.g. tyres) is usually digested with caustic soda to remove the fabric. The oils and heat have a softening effect and a product is obtained which can be used as cheap substitute for new R, and which can be vulcanised in the same way as new R. The physical properties of vulcanised reclaimed R are much inferior to those of similarly vulcanised new R.

RUBBER GOODS MANUFACTURE—This can be broadly divided into two classes, that based on dry rubber, by far the larger, and that based on preserved latex.

Manufacture of Goods from Dry Rubber—Although goods based on dry R cover a tremendous range in consistency and uses there are relatively few different manufacturing processes. The main ones are extrusion, calendaring and press building. Many articles are hard built from sheets of R extruded R and R covered fabric. Vulcanisation with the exceptions given above is always one of the steps. It is mainly up to the addition of different ingredients and different amounts of the same ingredient that the manufacturer relies for obtaining different end products.

As the R as received is too hard for mixing with other ingredients it is first masticated. This is done either by passing the R many times through the nip between two revolving rollers or by feeding into very sturdily constructed internal mixers with strong blades. By this mechanical treatment the R becomes softer and stickier and more like putty, the degree of change depending on the length of time of mastication. This mastication reduces the R to a state in

which it will readily mix with other ingredients and also decreases the elastic properties of the R which is necessary to aid extrusion and calendaring.

The next operation is mixing, carried out on the same types of machine as is mastication. In the case of open mill mixing the masticated R is allowed to form a band round one roller with excess R forming a bank in the nip between the rollers. The other ingredients usually ground extremely fine are then added to the R in the nip, whereupon, by passing through the nip with the R, they become intimately mixed into it. In the case of internal mixers the masticated R is fed into the machine and the other ingredients added. These are then kneaded into the R by passing with it through the narrow clearances between the blades and the walls of the mixer. In either case the mixing operation is always finished by blending the plastic mass by passing it through the nip of a two roll mixer to homogenise it and obtain it in convenient sheet form. Internal mixing is much faster than straight two roll mixing.

Since Goodyear's day the art of R compounding has developed considerably. Modern compounding will be illustrated by giving a mix for a particular job, below is a typical first quality tyre tread compound.

	Pts by Wt
Smoked sheet	100 0
Gas black	47 5
Pine tar	2 0
Antioxidant	1 5
Zinc oxide	3 0
Stearic acid	3 0
Vulcanisation accelerator	1 0
Sulphur	3 0
	<u>161 0</u>

The last four ingredients are grouped together as these form a modern vulcanising system. The vulcanisation accelerator greatly speeds up the rate at which the R and sulphur combine. A few inorganic substances such as zinc oxide and litharge increase the rate of vulcanisation, but certain complex organic chemicals such as mercaptobenzothiazole and diphenylguanidine have a much more powerful effect and are nowadays used almost exclusively. Certain accelerators are so powerful that they can vulcanise R in about 24 hrs at room temp. When accelerators are used much less sulphur is required than would otherwise be the case. Most accelerators function best when an activator (such as zinc oxide) and a fatty acid (such as stearic acid) are present. The stearic acid and pine tar aid the mixing and subsequent extrusion operations. Antioxidants are certain organic chemicals which have been found to prolong the useful life of R articles and reduce perishing. The gas black (made in the U.S.A. by the incomplete combustion of natural gas) greatly improves the abrasion resistance of the compound, as is required in a tyre tread. Many materials other than those in the above mix are added to R compounds, either

to improve the properties of the finished article or to cheapen it. After mixing the compounded R is ready for either extrusion or calendaring.

Extrusion—An extrusion machine is somewhat similar in design to a household mangle machine though much more strongly built and motor driven. It consists of a barrel containing a rotatable worm. At one end of the worm is a feed opening. The barrel is longer than the worm at the other end and at the end of the barrel is the die which shapes the plastic mass to the desired form. In operation the compounded R is wormed up on a two roll mill similar to a mixing mill, and then cut into strips and fed into the machine. When enough material has been accumulated to build up a pressure in the space between the end of the worm and the die the R extrudes through the die in the desired shape. A modification of the extrusion machine is used for covering wire and other materials with R. The extruded material is often placed in trays of tin or on a mandrel to help the plastic material retain its shape. After being placed in trays of take many types of R goods such as gas tubing, all rubber garden hose and door seal sections are vulcanised in autoclaves, using steam at about 40 lb pressure as the heating medium. Unvulcanised extruded sections are also used as blanks for mouldings and as parts of hand built articles.

Calendaring—A calender is used to obtain a continuous long length of uncured R stock free from all blisters and of uniform gauge. It consists of three or four hollow steel rolls similar to those on a mixing machine but placed one above the other. In operation the wormed up stock is fed into the nip between the top rolls forming a bank. The material which passes through this nip is then led through the nip between the third and second rolls. The nip openings are arranged so that a much smaller bank is formed here. By this decreasing size of bank air pockets in the stock are eliminated. The sheeted material is finally wound up on a metal drum some method such as interleaving with cloth being used to prevent the sticking together of the separate turns on this roll. Normally very fine sheetings are built up from a number of thin layers using special fittings on the calender for this. The calender is also used for impregnating fabric with R and for covering fabric with a layer of R. The calendered material may be used as 'blanks' for moulding, or as part of a hand built article or be vulcanised as sheeting in steam heated autoclaves. Many types of gaskets, packings and so on are made by cutting or punching the desired shape from such vulcanised sheeting.

Spreading—Both raw and compounded (but unvulcanised) R disperses to form a colloidal solution (dispersion) in a number of organic solvents. Thick solutions or doughs can be made by soaking the stock in a solvent and then homogenising the mixture in a mixer which may resemble a baker's dough kneading machine, though other types are also used. Naphtha, a

solvent obtained from coal tar, is used almost exclusively for making doughs. These doughs are used for rubberising fabric by the use of a spreading machine. This consists of a rotatable roller with a fixed steel blade above the opening between the roller and the blade being adjustable. The cloth to be spread is drawn through this opening and a sufficient quantity of dough placed on the cloth in front of the blade so that by the wiping action of the blade a thin layer of R passes through the opening on the cloth. Very thin layers may be applied in this way. Usually six layers are applied so as to obtain a finished coating free from pin holes. For example a hunter-type raincoat usually consists of two layers of cloth each of which has been spread four times. The spread material is used for example for uncoated hospital sheetings, baggage balloons etc. It may also be used as part of such built-up articles as galoshes. The spread sheeting can be vulcanised directly by placing in steam autoclaves or by festooning in hot air chambers. Thin spread articles are sometimes cured by the cold cure method as this gives a pleasant velvety feel to the R. Vulcanisation using warm temp accelerators is now largely used for raincoat material.

Moulding—R cannot be cast like metals because it decomposes on melting. In the R industry moulding means placing a piece of compounded R of suitable size and shape in a metal mould. The mould is then closed in a steam heated hydraulic press. The pressure and heat cause the R to flow to the shape of the mould. The further action of heat vulcanises the R, so that on opening the mould the article is obtained in the desired shape and also vulcanised. Moulded goods include, for example, hot water bottles and also such things as tyres, in which case the blank is built up from extruded and calendered R and fabric.

Manufacture of Goods from Latex—The production of goods straight from latex is a much newer process than production from dry R. It is used to make many types of very thin articles such as surgeons' gloves and toy balloons. It is also used for adhesives in the footwear and flooring trades. The production of sponge for upholstery is also important.

In compounding the vulcanising and filling ingredients are made into water dispersions and then stirred into the latex. The chemicals used are the same as those for dry R. Seamless articles are made by dipping a former of the desired shape in compounded latex. On withdrawal a thin film of latex adheres to the former. After redipping if necessary, to build up a thickness, this film can be dried and cured in hot air. Latex sponge is produced by whipping the compounded latex into a foam. The whipped latex can then be poured into moulds and by the use of special chemicals gelled in the framed state when it is further dried and vulcanised.

SYNTHETIC RUBBERS—An enormous number of experimental polymers and copolymers have been produced in the last

sixty years and of these a few have been found, by a vast process of selection by trial to be suitable for use as synthetic R and plastics. For synthetic Rs polymers of butadiene (a chemical similar to isoprene) and copolymers of butadiene and other chemicals have been most widely used. Also important are polymers of chloroprene and to a lesser extent polymers of the polysulphides of such organic chemicals as ethylene. Some other polymers are also used to a small extent for special purposes.

General purpose Synthetics—These are synthetic Rs intended to replace natural R for all purposes and have been produced by countries for national security reasons. Most important are copolymers of butadiene and styrene (BMS in Germany, GR-S in U.S.A.). Both these countries have successfully produced this synthetic R on an enormous scale and it has been a reasonably successful substitute for natural R. It can be processed, compounded and vulcanised in the same way as can the latter.

Special purpose Synthetics—In certain applications natural R parts fail quickly. A most important case is where they come in contact with motor oils and fuels which cause them to swell and disintegrate. Some materials have been developed to meet the need of an oil resistant elastomeric material for use in car and aeroplane parts. Butadiene acrylonitrile copolymers (HyCar OR, Perbunan in U.S.A., Bentan in Germany) and chloroprene polymers (Neoprene in U.S.A.) are the most widely used and most nearly resemble natural R in vulcanised properties including elasticity. They can be processed and compounded in the same way as natural R and the butadiene acrylonitrile copolymers can be vulcanised in the same way as natural R. The chloroprene polymers are however vulcanised by zinc oxide and magnesium oxide. The polysulphide polymers (Thiokol in U.S.A., Novolax in Great Britain) have excellent resistance to fuels but their general physical properties are poor compared with natural R, and their use is restricted to applications where their inability to recover from deformation quickly is not important.

RUBBER AND PLASTICS—There has been a great increase in the production of plastics (qv) of various kinds in recent years and they have been in competition with natural R in many fields. In the raincoat and vulcanite trades they have taken over a considerable amount of the demand formerly supplied by natural R. Their bright glossy finish is one great advantage but the generally higher cost per pound of plastics and their non-elasticity has so far limited their use.

See C. Goodyear, *Gum Plastic* 1855; H. Barron, *Modern Natural Chemistry* 1937 and *Modern Synthetic Rubbers* 1942; A. I. Edgar, *Manual of Rubber Planting*, 1937; C. F. Flint, *Chemistry and Technology of Rubber Latex*, 1938; A. M. Ladd, *History of Rubber Regulation* 1944, and *Fundamentals of Rubber Technology*, pub ICI Ltd., 1947.

Rubble, form of stone used in masonry. In rubble-work the stones are of different sizes and are laid unevenly, whereas in the other kinds of masonry such as coursed work and ashlar the stones are squared and dressed. See MASONRY.

Rubbra, Edmund (b 1901) Eng composer, b at Northampton and educated at Northampton Reading Univ, and the Royal College of Music where he was a pupil of Holst and of Vaughan Williams. His works include five symphonies, *I, A Belle Dame Sans Merci*, an opera *Beebeebet*, sev smaller orchestral works and a number of songs. His work is strongly individual and he makes skilful use of melodic invention and elaborate counterpoint.

Rubefacient, medicinal agent applied to the skin with the effect of reddening it by dilation of the superficial capillaries. The effect of such a remedy is to allay inflammation by counter-irritation. The most commonly used are hot water mustard, pepper, turpentine and chloroform.

Rubella, see under MEASLES.

Rubens, Sir Peter Paul (1577-1640), Flem painter b at Siegen in Westphalia where his father Jan R. was in exile. At the age of sixteen he entered the household of the counts of Lalau as page, and later studied under Van Oort, Verhaeght and Otto Vennius. In 1600 he visited Italy where he finally took up his residence at the court of Mantua. His stay at Venice brought him under the influence of Titian and Paolo Veronese and affected his later development, probably teaching him much of the art of colour in which he excelled. In 1605 he visited the Spout, where he executed many portraits. Three years later he returned to Antwerp where he married Isabella Brant (1609). Here numbers of eager students flocked to his studio and of these he made use in the execution of the orders which flowed in without ceasing. Hence it is almost impossible to say how much if any of his work is his own. This may also account for the mediocrity of many of the paintings of his 'middle period'. In 1620 he received the commission for the series of paintings of the life of Marie de' Medici now in the Louvre and these were completed in five years. In 1629 he visited England where he was warmly received by Charles I. Having become a widower in 1626 he married Helena Fourment in 1630. She appears in many of his paintings. Charles I knighted him in 1632. P. is a master of those parts of his art which act immediately on the senses, especially in the portrayal of the tumult and energy of human action in full power and emotion. He shows the early baroque period at its most human and at its richest. During the present century a growing number of critics have been questioning the æsthetic merit of Rubens's achievement as a whole. While his technical ability is fully appreciated by artists and critics, he is now considered by many to be lacking in refinement and in much of his work in that spirituality of vision which has distinguished the greatest paintings of the past. His religious

paintings, of which 'The Descent from the Cross' is the most famous, are now generally thought to be his best work, showing not only great talent as a colourist but a deep understanding of the sacred and devotional. Other famous paintings of his are 'The Last Judgment' (1616 and 1618), 'The Battle of the Amazons' (1619), and 'The Garden of Love'. See lives by M. Rooses 1886 91, J. Burckhardt 1928 and I. Muls 1946, also K. Cammaritz *Rubens Painter and Diplomat* 1932, K. R. Lichmann *Peter Paul Rubens Menschen und Mächte des Barock* 1936, C. Vaisochau *Rubens, das Spektrum flanderns* 1938, I. van Puyvelde *The Sketches of Rubens* 1945.

Rubiaceae (lat *rubia* madder from *rubens* red) large family of plants indigenous to S.E. Asia the typical genus of which is the *Rubia* or madder. The plants are monopetalous with opposite leaves interpetiolar stipules, the stamens are inserted in the tube of the corolla alternating with its lobes. John Lindley (q.v.) divided the family into *Galacnæ* and *Cinchonacæ* (see CINCHONA) but Joseph Hooker (q.v.) reverted to the old arrangement. Some of the chief species of *Rubia* are *R. peregrina* a brist plant with yellowish flowers, *R. tinctoria* or madder, *R. cordifolia* and *R. sikkimensis* which yields a dye. The family was classified by A. I. de Jussieu (q.v.) in 1789.

Rubicon, small stream of ancient Italy flowing into the Adriatic N. of Ariminum (Rimini) and forming the frontier between Italy and the provinces (Gallia Cisalpina). It is the modern Fiumelione. It is noted for CÆSAR'S passage across it at the head of his army (49 B.C.) this act amounting to a declaration of war against the Senate. Units of the famous British Eighth Army crossed the R. near San Arangelo and Poggibonni in Sept. 1943 forcing the crossings against Kesselring's Ger. troops. See Suetonius *Julius* xxxi.

Rubidium, symbol Rb atomic number 37 atomic weight 85.4 one of the alkali metals. It was discovered by Bunsen in 1840 by spectroscopic examination of the residue obtained by evaporating the mineral water of Durkheim. It also occurs in rare minerals as pollux and lepidolite and in tea coffee cocoa and tobacco. The metal is obtained by heating a mixture of the carbonate with carbon and calcium carbonate or alternatively by the electrolysis of fused Rb hydroxide in a nickel crucible. It is a white chemically active metal melting at 39° and its properties are very similar to those of potassium.

Rubinstein, Anton Gregorovich (1830-1894) Russian pianist and composer b at Weichotzyetz Podolsk of Jewish descent. He studied in Moscow and Berlin. At the age of twelve he had already appeared as a pianist in various European cities. In 1858 he became court musician at St. Petersburg. In 1859 he became leader of the Musical Society in St. Petersburg and in 1867, with his brother Nicolai (1835-81), a pianist of great ability, founded the conservatory there. His chief tours took place between 1867 and

1873 in which period he earned a great reputation in Europe and America. The latter years of his life were devoted chiefly to recitals at Berlin and Dresden and to criticism. A composer of the Schubert Mendelssohn traditions R was autogenic to the Neo Russians and to the Wagner Lyst coterie. He was a prolific writer of piano and vocal music and is remembered chiefly by his four piano concertos and the *Ocean* symphony. He wrote also some operas and oratorios. He was a pianist of transcendent ability and the only serious rival to Liszt. See lives by J Rodenberg 1895 and N D Bornstein 1911.

Rubinstein, Artur (b 1890) Russian born Amer pianist b in Warsaw then in Russian Poland. He gave his first recital at the age of eleven and studied music in Berlin. He toured N America in 1906 and S America in 1918. He settled in Los Angeles in 1927. R has written some original compositions but is known primarily as a brilliant pianist.

Rublyov, Andrea (c 1370 c 1430) Russian artist. He painted the most famous of the Russian icon painters. His work was very similar to that of the Cretan school but the general tendency was for him and other Russian icon painters to paint pictures with a stronger emotional and religious appeal. What little of his work survives is to be seen in the Troitsa-Sergievskaya monastery now a museum near Moscow.

Rubrics (Lat *ruber* red) rules and directions for the conduct of the divine service laid down in the service books of the Church. They are so called because originally written or printed in red letters. The early service books contained very few directions for the guidance of the clergy but R were added at different times to assist them. In the Church of England there is greater flexibility allowed to the officiating priest than in the Rom Catholic Church and this applies more especially in the mass. Here nothing is left to the impulse or discretion of the officiating priest everything that he has to say and even the tone and gestures are carefully prescribed in the general R or in the running R which accompany the text. Anglo-Catholic clergy however are usually punctilious when officiating at the services. In the Church of England some of the R are tacitly ignored for instance the rubric that specifies the time of baptism of infants and the other rubric that lays down the rule for the number of godparents. It is seldom that these and some others are strictly observed.

Rubruquis, Guillaume, see RUYSBROECK WILHELM.

Rubus, genus of shrubs or herbs with white or pink flowers in terminal or axillary clusters followed by edible fruits. *R. idaeus* is the raspberry, *R. fruticosus* is the bramble or blackberry a collective name for a great number of distinctive forms. *R. chamaemorus* is the cloud berry, which occurs in peat bogs in the N, and bears fragrant fruit which is first red and then orange.

Ruby, precious stone of corundum and

thus of the same composition as sapphire, except for the substance probably chromium causing the red coloration. It crystallizes in the hexagonal system has a range of colour from pink to deep red or violet has a sp gr of 4 and a hardness of 9. The R is dichroic that is it exhibits two different shades when examined with a dichroscope and this property serves to distinguish it from garnet and spinel which are not doubly refracting. True or oriental Rs are found in greatest quantity in Burma and Siam the prin list being Mogok N of Mandalay they are found in smaller quantity and of poorer quality in Ceylon and Afghanistan. Many stones known as Rs are garnets or spinels. Small Rs used to be fused together to form a large or reconstructed R. Verneuil has succeeded in producing artificial Rs from ammonium and chromic oxide closely resembles the natural stone but its glass-like perfection lacks the colour nuances of the gems.

Ruby-Flies, or **Ruby-Tails**, parasitic family of hymenopterous insects named from the brilliancy of their colouring which shines with a metallic glow.

Ruby Spaniel, see under SPANIEL.

Ruby Sulphur, see RULAND.

Ruceccellai, Giovanni (147-152) Italian poet b at Florence and sent as ambassador to Venice in 1500 later taking an active part in the measures which led to the restoration of the Medici family. In 1522 he was sent as ambassador to France and subsequently Pope Clement VII appointed him governor of the castle of St Angelo. He endeavoured to make Italian poetry classical in form and was the author of two tragedies in the style of Euripides *Rosa munda* and *Oreste* but as in the plays of Trissino, Speroni and other lesser Italian tragic poets of the Renaissance the finer humanistic elements considered as a revelation of the world and mankind had no place. He also wrote a didactic poem on bees entitled *Le api* (1539) based on Virgil's *Georgics* book iv.

Ruckert, Friedrich (1788-1866) German poet and orientalist, b at Schweinfurt. He was prof of Arabic Persian and Sanskrit at Erlangen and then at Berlin. R who was a master of over twenty languages was chiefly known as a translator of oriental poetry and as a writer of poems inspired by the spirit of oriental mysticism. His best known works are his lyrical poems *Liebesfrühling* and his patriotic songs, *Liedersche Sonette* and *Spott und Ehrenlieder*. In 1834 appeared his beautiful *Kindertotenlied* inspired by the loss of his young son and daughter. Among his original poems on oriental themes are *Morgenland die Sagen und Geschichten* (1837), *Rost und Suhrub eine Heldengeschichte* (1838) and *Brahmanische Erzählungen* (1839). His most elaborate work is *Die Wärsheit des Brahmanen* pub in 6 vols in 1836-39. Among his translations of oriental classics is *Die Verwandlungen des Alisid* a rendering of Hafiz's *Makamun* (1826). See lives by C Beyer 1868 and F Golling 1915.

Rudbeck, Olaf (1630-1702), Swedish author and scientist b at Westeras. He studied medicine at Upsala where he later became prof of practical medicine and botany. R was the discoverer of the lymphatic glands. He founded a type of polytechnic school at Upsala, and pub poems music etc.

Rudbeckia, genus of composite plants. It received its name from Linnæus in honour of the Rudbecks who preceded him in the botanical chair at Upsala. The thirty species grow in N America.

Rudd, or Red Eye, fresh water fish, *Scardinius erythrophthalmus* allied to the roach. It is tinged with bronze and has reddish fins, the dorsal being further back than that of the roach. It is found in Brit and European lakes and sluggish streams. The largest run to 3½ lb and may be as much as 14 in long.

Rudder Fish, see *Pilot Fish*.

Rudesheim, tn in the Rhineland, opposite Bingen on the Rhine. It is a noted place for wine. Pop 4700.

Rudock, tn of Libert on the Kashmir frontier. It is situated 15,000 ft above sea level.

Rudolf I (1218-91) Ger king and Holy Rom emperor son of Albert IV count of Hapsburg and landgrave of Alsace. He succeeded his father as head of the family in 1239 and having become the most powerful prince in the country was elected king of the Germans in 1273. In 1278 he fought a successful war with Ottokar II of Bohemia who was killed in the battle of Marchfeld. In 1282 he invested his sons Albert and R with the duchies of Austria and Styria respectively. He had won these from Ottokar. He is chiefly memorable as the founder of the greatness of the house of Hapsburg. See life by O. Hedrich 1903.

Rudolf, or Rodolph, II (1552-1612) emperor of Germany, king of Bohemia and of Hungary, b in Vienna and educated at the Spicuit. R was the son of the Emperor Maximilian II and Mary of Austria. Throughout his life he showed a lack of will and a morbid timidity. R, however was a man of fine culture, devoted to the arts and sciences. He much improved the city of Prague during his residence there and patronised Brahe (q.v.) and Kepler (q.v.). He was much influenced by his favourites and appears to have been, in his latter years, mentally unbalanced. R was in part responsible for the violent persecutions in Bohemia and Moravia which characterised the Catholic reaction of the first years of the seventeenth century. He was compelled to abdicate the throne of Bohemia in favour of his brother Matthias May 23 1611. See life by A. Lindels 1863-6.

Rudolf, Franz Karl Joseph (1858-59) archduke and crown prince of Austria. Hungary only son of the Emperor Francis Joseph. He was a good linguist, and besides assisting in the pub of *Die Österreichische Ungarische Monarchie in Wort und Bild* (1886), he wrote *A Journey in the East* (1884) and *Fifteen Days on the Danube* (1885). He married Stephanie, the daughter of the king of the

Belgians in 1881, he committed suicide with the Baronsess Vetsera, in circumstances which have never been fully clarified, at Mayerling, near Vienna.

Rudolf of Ems (fl 1220-54) Austrian minnesinger. He wrote *Barlaam* and *Josephus Alexander*, and other epic poems, and a *Heilchronik* dedicated to Conrad IV.

Rudolph (Rudolf) Lake, African lake partly in Abyssinia but for most of its length in N W Kenya. It is 190 in long and 37 m wide at its widest point. It was discovered in 1881 by Teleki and von Hohnel who named it after Crown Prince Rudolf of Austria Hungary. It is the centre of an inland drainage system. The recession of the waters of the lake has left stretches of fine sand which are being deposited over the land by the strong S easterly wind with resulting erosion of topsoil. The area lying roughly between the lake and the Turkana Lake upment, known as Rudolf Froy was transferred from Uganda in 1926 to Kenya Colony.

Rudolstadt, tn and dist of Thuringia Germany. The tn is on the S side 18 m S of Weimar. Its prin buildings are the fifteenth century church, the castle, and the famous palace containing a natural history museum gymnasium and an extensive library. The chief industries are the manu of the celic porcelain pianos artistic cabinet work chemicals etc. R was founded in the seventh century. Pop 18,000. The dist has an area of 229 sq m and a pop of 60,000.

Rudra, Hindu god in the Rigveda or Vedic mythology. It is the storm god or lord of the Maruts later identified with Siva. R is sometimes a collective name of the Maruts (gods of the tempests).

Rue, Warren de la, see *Dr T. Rue*.



MEADOW RUE

Rue, term applied in botany to species of the genus *Ruta* in the family Rutaceae, and also in compound words to the leguminous fodder plant *Galga officinalis*, the goat's R, and the ranunculaceous plant *Thalictrum flavum* the meadow R. R

graveolens, the common R., or herb of grace, is a shrub containing a volatile oil used in medicine as a narcotic and stimulant.

Rueda, Lope de (1510-65), Sp dramatist, b. at Seville. He was originally a gold-beater, but later organised a strolling company of players. He took a part in the secularisation of the drama, which was developing all over Europe in his time. His plays were acted at Seville, Cordova, and Segovia. His regular comedies are modelled largely on those of It. authors of the early sixteenth century. His pieces, which have the character of the coming comedy of intrigue, include such witty interludes as *El Convidado*, *El Rufian Cobarde*, and *Los Aceifunas*. See study by G. Salazar, 1911.

Rueil, tn. of Seine-et-Oise dept., France, 5 m. N.W. of Paris, at the foot of Mont-Vaérien. Its church contains the tomb, of the Empress Josephine and her daughter Hortense, and the former's residence, Malmaison is near by. Buzenval, scene of the battle (1871), is 2 m. S. There are chemical and metal industries. Pop. 18,000.

Ruff, frill made from linen or lawn and worn on top of the neckband. It was popular with both sexes in the sixteenth and seventeenth centuries, and with the introduction of starch it greatly increased in width. It varied in length from one and a half to six yards and was drawn up by a string. The earlier form relied more on elaborate folds for its effect, but lace, gold and silver, and jewellery decorated the later type, or *whisk*. A suit of Ruffs consisted of a R. with a pair of matching cuffs.

Ruff and Reeve (*Maculipes pugnat*), summer migrant to low lying, marshy districts of Britain. The polygamous males (Ruffs) vary considerably in plumage, but during the breeding season the neck is surrounded by a ruff or frill of purple-black feathers barred with chestnut. These fall at the end of June, they are believed to act as a shield for the bird, in their numerous fights with one another. The females (reeves) have no R.; they lay four spotted green eggs in a nest of coarse grass made amongst reeds or rushes.

Ruffe, or **Pope**, perch like fish known as *Acerina cernua*. It is a species of Percidae, is edible, and inhabits the fresh water of Europe. The dorsal fin is continuous in the R., whereas in the perch there are two separate fins.

Rufiji, or **Rufiji**, riv. of E. Africa, rising in the Livingstonia Mts. It forms the Suguli falls and the Pangani rapids, and flows E. to the Indian Ocean, discharging by a delta opposite Mafia Is. It is navigable in part. In July 1915 the German cruiser *Königsberg* was destroyed in the riv.

Rufisque, see under DAKAR.

Rufus, emperor of Germany, see OTHO II.

Rufus, William, see WILLIAM II.

Rug, see CARPET.

Rugby, tn. of Warwickshire, England, situated on the Avon, 13 m. S.E. of Coventry and 82 m. N.N.W. of London. In the early nineteenth century R. was little more than a vil. The tn. expanded

with the advent of the London and Birmingham Railway in 1838. It returns one member to Parliament, and is an important railway centre and mkt. tn., with textile, electrical, and engineering industries, but is best known for its famous public school (*q.v.*) Pop. 45,500.

Rugby League, see under FOOTBALL.

Rugby School, public school situated at Rugby, England, founded by Lawrence Sherri, a native of Rugby, gentleman of the Princess Elizabeth, and member of the Grocers' Company, in 1567. The school is endowed with property in Rugby and London. The first buildings were near the par. church, but the school removed to the present site about 1750, and the existing buildings were begun in 1809. There have since been many modern additions. There is accommodation for 670 pupils, who are divided among eleven houses (sixty day boys, the rest boarders), and there are numerous entrance and leaving scholarships. R. S. is governed by a body of fourteen. Thomas Arnold (*q.v.*) was headmaster from 1823 to 1842, and it was under his guidance that the school became famous, and a pattern, both educationally and spiritually, for many Eng. public school foundations of the nineteenth century. Taft, Frederick Temple, and Percival were later headmasters. R. S. is the scene of *Tom Brown's Schooldays*. Rugby football was originated here in 1823.

Rugby Union Football, see under FOOTBALL.

Ruge, Arnold (1802-50), Ger. reformer, b. on Rugen Is. He studied philosophy at Halle, Jena, and Heidelberg. For his part in the Burschenschaft agitations (1821-24) he was imprisoned for five years at Kolberg. With Eichtermeyer, he founded the *Halle'sche* (later *Deutsche*) *Jahrbücher* (1837), the organ of the young Hegelian school. This periodical was suppressed in 1843. R. shared in the revolutionary movement of 1848 but in 1849 with Giuseppe Mazzini and Ledru-Rollin fled to seek refuge in London, forming a European Democratic Committee. From thus R. soon withdrew and went to Brighton in 1850. His *Gesammelte Schriften* were pub. in 1846-48. See his memoirs, *Aus früherer Zeit* (1863-67).

Rugeley, urb. dist. and mkt. tn. in Staffordshire, England, 9 m. S.E. of Stafford, on the R. Trent. It is engaged in coal mining and has iron foundries, tanneries, and mills. The grammar school was founded in the seventeenth century. Pop. 4,500.

Rügen, Ger. is. in the Baltic Sea, separated from the mainland by the Strela Sound. It is divided into the peninsulas of Wittow, Jasmund, and another in the S.E. The soil is fertile and produces good crops and fruit trees. Cattle are reared, and the fisheries are well worked. There are some ancient remains on the is. It has belonged variously to Denmark, Sweden, Pomerania, and Prussia. Cap. Bergen. Area 373 sq. m. Pop. 54,000.

Rühmkorff, Heinrich Daniel (1803-77), Ger. electrician, b. in Hanover. He went to Paris in 1819, and there set up a busi-

ness for the manufacturing of electrical apparatus. He was the inventor of the R induction coil (1851).

Ruhr, Ger. riv. which rises in the Wintberg and flows in a N and then a NW direction to enter the Rhine at Dulsburg. The riv. flows through an extremely rich coal field, and gives its name to the R basin (Ger. Ruhrgebiet), one of the most important areas of heavy industry in Europe. Before the Second World War this area produced 75 per cent of Ger. coal, 85 per cent of Ger. iron, and 80 per cent of Ger. steel. Length of riv. 145 m. Area of basin about 1800 sq. m.

Position of the Ruhr Basin in Modern Europe—By 1914 Bochum (q.v.) Dortmund (q.v.) and Essen (q.v.) had become the prin. industrial centres in the R basin. Essen was the home of Ger. armaments, owing its industrial growth largely to Alfred Krupp (q.v.) and his son. After the First World War France (especially) feared the possibility of the R basin becoming an armaments centre once again. By the treaty of Versailles (1919) Germany undertook to disarm, which meant the conversion of the R factories to civilian production and agreed to make reparations in money and kind to the Allies. In July 1922 Germany gave notice that she could no longer make the payments agreed upon. Under the treaty of Versailles such a situation was provided for, and the govs. concerned had the power to take any action deemed necessary against Germany without Germany being entitled to regard such actions as acts of war. Belgian and Fr. troops accordingly marched into the R and occupied certain areas in Jan. 1923. The troops were preceded by engineers, custom house officials, and foresters necessary to work the area. The Gers, however, adopted passive resistance methods and obstructed the work as much as possible. This resistance was maintained until Nov. 1923, when Germany began to co-operate with the Allies in working the area. The R was evacuated during 1923. After 1933 the war industries of the R basin were re-established at first secretly, Ger. industrialists co-operating with the National Socialist regime. During the Second World War the area was therefore an important target for allied bombers. The first R.A.F. attack on Essen was made in 1940, from 1941 until the end of the war the R was constantly attacked, the offensive reaching its height in 1944-45. On March 24, 1945, the Allies made a crossing of the Rhine and the R basin was encircled by the Amers, capitulating by mid-April (see further under AIRIAL WARFARE). EUROPEAN HISTORY, GERMANY, History, Essen, MOHNF. etc.). After the Second World War the R basin lay within the Brit. zone of occupation. More drastic dismantling of its industries was determined upon than had been the case in 1919, but the unstable state of Ger. economy and allied differences made a complex situation even more difficult, and dismantling was still taking place in 1950. Coal production was encouraged, and by the end of 1947 the R was pro-

ducing per month rather over half of the average monthly total for 1939. Its ultimate future remained undecided. Fr. opinion favoured a separation of the area from the rest of Germany, under Inter-national control, but Britain and America wished it to remain a part of Germany, under allied supervision. In May 1950 the Fr. foreign minister Robert Schuman suggested that France and W. Germany should have a common coal and steel pool. The Ger. chancellor welcomed this statement which seemed to mark a change in France's traditional attitude. It implied Fr. acceptance that the R was Ger. and a realisation that both countries were economically interdependent.

Ruhrort, formerly a separate tn in the Rhine at the junction of the Ruhr with the Rhine 24 m N of Düsseldorf. One of the chief riv. ports of lower Germany, it exported coal and manufactured iron goods and machinery. In 1905 it was incorporated in Duisburg.

Ruislip-Northwood, urb. dist. of Middlesex, England, comprising Eastcote, Northwood, Ruislip and S. Ruislip. One fifth of its area is open space, including three golf courses and extensive woodlands. It returns one member to Parliament. Pop. 66,000.

Ruiz, José Martinez, see MARTINEZ.
Ruiz, Juan (1283-1350). Sp. poet and archpriest of Hita. He was imprisoned between 1333 and 1347 by order of the archbishop of Toledo for a breach of eccles. regulations. The poem *Libro de buen amor* by which he is remembered appears to have been founded upon episodes in his own life. His poetry is contemporaneous with and similar in character to the poetry of the troubadours. See also J. V. Puyol 1906 and O. Lake 1913.

Rule, or **Regulus**, Jr., Gk. legendary monk in the fourth century who was said to have brought some of the bones of St. Andrew to Muckross (now St. Andrews) from Iatras, Greece. He may have been confused with St. Ricul, traditionally the Gk. first bishop of Senlis.

Rule of Faith (*Regula Fidei*) short statements of belief which the early Church put into the mouth of those about to be baptised and which formed the safeguard and expression of the orthodox faith. A rudimentary specimen may be seen in 1 Cor. xv. 3-4 and there is a reference to such a formula in 2 Tim. i. 13. They are the basis of the Catholic creeds. See A. Hahn *Bibliothek der Symbole* 1842 3rd ed. 1897.

Rule of the Road. *On Land*—In England a vehicle or horse when meeting another vehicle or horse should keep to the left hand side of the road except when it is dangerous to adhere to the rule. When a vehicle or cyclist (a pedestrian where there is no side walk) meets a ridden horse the rider of which is also leading another horse the vehicle etc., should pass on the side of the ridden horse. The R.s of the R in Great Britain for motor drivers are (1) to drive on the left of the road and (2) to overtake vehicles on the right. Trams may be passed or overtaken on either side, which-

ever be safer (are) is to be taken in passing stationary trams and in some cases it is forbidden to pass them on the near side. Street refugees must be passed on the left, even if it involves taking a wide detour to go round a corner. As regards one way traffic and circuitory systems the rule of keeping to the left and over taking on the right is varied by the direction in which traffic is diverted at the outlets. As to crossing, the rule is to give way to main road traffic whether entering or crossing the road but this is not a law though it is customary for the main road traffic has no legal right to assume the precedence over cross road traffic. In crossing roads the 'off side rule' is that a driver need give way only to traffic on his right with no distinction as to main or side roads a dangerous option to exercise because the rule is by no means universally applied. Owing to the great increase in motor traffic and the rising mortality and accident rate special crossings for pedestrians were introduced in 1935 (see further under ROAD SAFETY, TRAFFIC REGULATIONS). In most countries of the Continent and in America the R of the R is exactly the opposite of that of England.

At Sea. When sailing vessels are approaching one another (1) the vessel which is running free must keep out of the way of a vessel which is close hauled, (2) a vessel which is close hauled on the port tack must give way to a vessel close hauled on the starboard tack (starboard denotes the right hand side looking from aft forward and port the left) (3) when both are running free with the wind on different sides the vessel which has the wind on the port side must give way to the other (4) when both are running free with the wind on the same side the vessel which is to windward must give way to the vessel to leeward and (5) a vessel which has the wind aft is running before the wind must give way to the other. When two steam vessels are meeting end on or nearly end on each must alter her course to starboard so that each may pass on the port side of the other. This rule applies only to cases in which in daylight each vessel sees the masts of the other in a line or nearly in a line with her own or, at night time, sees both the sidelights of the other. When two vessels are crossing the one which has the other on her own starboard side must keep out of the way of the other. A steam vessel must give way to a sailing vessel. Steam vessels, which are directed by the rules to keep out of the way of other vessels, must, on approaching if necessary slacken speed or stop or reverse their engines. A vessel overtaking any other vessel must keep out of the way of the overtaken vessel. In narrow channels a steam vessel should, when it is practicable keep to its starboard side of the mid channel. Sailing vessels under way must avoid sailing vessels or boats fishing with nets, lines, or trawls, but this rule does not permit vessels engaged in fishing to obstruct a fairway. In taking a course required by the above rules a steamer

under way must indicate her course by sound signals on her whistle or siren. One short blast means I am directing my course to starboard. Two short blasts mean I am directing my course to port and three blasts my engines are going full speed astern. The above rules are subject to any special rules of local authorities relative to the navigation of harbours or rivers. The rules are contained in the general regulations for preventing collisions at sea and prescribing certain signals of distress (Order in Council dated Oct. 13 1910 S. R. & O. 1910 No. 1113 amended by Merchant Shipping (Distress Signals) Order 1932 S. R. & O. 1932 No. 915).

Rules of Court. The expression R of C denotes the body of rules or orders regulating the practice or procedure of the courts superior and inferior. The 'Rules of the Supreme Court' (to be found in the Ann. Practice and the Yearly Practice, colloquially known as the 'White Book' and the 'Red Book' respectively) which by the Judicature Act 1875 were substituted for the Chancery Consolidated General Orders 1860 and the common law *Regulae Generales* were framed by the judges. The power to alter those rules from time to time in accordance with the demands of the law is vested in the Rules Committee composed of the Lord Chancellor and a majority of judges of the High Court. The rules of common law practice are made and revised by five of the court judges appointed for that purpose under the County Courts Act 1858 by the Lord Chancellor. Rules of other inferior courts are made subject to the concurrence of the Rules Committee. All R of C have the force of statute but most judges seem fully aware that many of the rules require correction and revision and hence interpret them as far as possible in accordance with the dictates of common sense rather than with the demands of forensic technicality.

Rum, is of the Inner Hebrides Invernesshire Scotland 16 m N.W. of Ardnamurchan Point. Its surface is mountainous the highest point being Ben Nevis 2667 ft. It is 8 m long, and 7½ m wide, and covers an area of 42 sq m. Pop. 250.

Rum, spirituous beverage distilled from cane sugar or its products. The best known varieties of R are those of Jamaica and Demerara. The common clear R of Jamaica is distilled from a wash consisting of skimmings from the cane sugar mill and of molasses. The distillation is carried out in pot stills and unlevered stills are connected with the still. Two distillations are necessary to produce the best spirit which is from 30 to 40 over proof. The dark colour of good R is due to its being stored in sherry casks but the colour may be acquired by the addition of caramel (burnt sugar). Flavoured or 'G.R.' R also made in Jamaica has an added flavour depending upon the addition of materials obtained by the fermentation of cane trash. Demerara R is often the product of patent stills and does not possess so strong a flavour as Jamaica R. Large quantities of spirit called R are

manufactured in Europe from beet sugar spirit, with the addition of artificial esters to imitate the flavour of the genuine article

Ruma Island, see under 109 ISLANDS

Rumania (Romania), republic of SE Europe situated on the Black Sea and bounded N by the Ukraine, W by Hungary and Yugoslavia, S by Bulgaria and the Black Sea and E by the Black Sea. The greater part of the S boundary is marked by the Danube. The boundaries of R have undergone many changes since the first decade of the twentieth century. By the treaty of Bucharest (1913) R gained a strip of ter extending from Mangalia to Ickene on the Black Sea by a line direct from above Iukhtukai on the Danube. By the peace treaties of 1919 R's right to Bessarabia, Bukovina and the Banat (the whole of Dobrudja and Transylvania) was recognised. In 1914 the area of R was 9710 sq m. In 1939 as a result of these additions the total area was 113584 sq m and the pop had more than doubled being 1993500. In 1940 R was forced to cede Bessarabia and the N Bukovina to Russia, S Dobrudja to Bulgaria and N Transylvania to Hungary. R was in fact ruled by Germany to enter the war against Russia in 1941 by the promise of Bessarabia, N Bukovina and in addition to between the Danister and Danipet called Transnistria. In 1941 the reduced R had an area of 10254777 sq m and a pop of 13551800. In Feb 1947 under a peace treaty between R and the Allies ratified the following: Aust Transylvania was restored to R, Russia returned Bessarabia and N Bukovina and Bulgaria, S Dobrudja. The area of R was estimated in 1947 at 88715 sq m and the total pop at 16400000.

R is divided into six provs. These are based not on administrative divs but correspond to historical tradition. The provs are Muntania (Wallachia), Transylvania, Moldavia, Oltenia, Banat, Bessarabia, Bukovina and Dobrudja. There are fifty nine administrative cos. The chief tns are Bucharest, the cap pop 984600 (1949), Jassy, 109,000, Timisoara, 108300, Iasi, 105100, Galatz (Galati), 101000, Cluj, 98000, Braila, 97200, Oradea, 92900. Tns of importance having a pop of less than 90000 are Brasso (Brasov), Arad (Constanta), Craiova, Sibiu, Satu Mare and Targu Mures. About a fifth of the pop live in the tns. All the prin rvs flow into the Danube, one, the Pruth, being the boundary with the USSR. The Danube enters R through the Kazan Pass with the famous 'Iron Gates' at the E end so named by the Turks because of the submerged rocks in the waterway. High rocky mts overshadow the riv on both sides, clad with pine and birch as it flows to the sea. It widens and gains in depth and the banks gradually level so that for 290 m the shore is flat, desolate, and marshy, varied by cities and chains of lagoons. The chief rvs which join the Danube in Wallachia are the Jiu, the Olt, the Argesul, and the Jalomitzu. The

Sereth rising in the Transylvanian Mts, flows 340 m through Moldavia and joins the Danube near Galatz. The Pruth rises in the extreme N of Moldavia, flows for 350 m and joins the Danube 10 m E of Galatz. The whole of the country lies in the basin of the lower Danube, and consists of a great plain stretching up from the E of the riv to the Carpathian Mts, beginning with mud flats and a level lowland which joins the lower ridges of the Carpathians and forms the most fertile part of the country. The remainder of the land is rocky with transverse valleys where alpine plants flourish. The climate is inclined to extreme cold in winter and great heat in summer; the spring is very short, the autumn forming the mildest season of the year.

Produce—The country is naturally agricultural and about 45 per cent of the land is under plough; the fertile soil produces good crops of maize, wheat, barley, oats, millet and corn. Vine are grown extensively, the vine area being 420000 and a large quantity of red and white wine is made. Cattle breeding is on a large scale with the rearing of sheep and swine, tobacco, flax and hemp are also cultivated. 21 per cent of R is forest land and timber is an important product. In 1921 agrarian reforms transferred 85 per cent of the land in fairly small lots to the peasants. Any remnants of feudalism were speedily eliminated after 1911. After the establishment of the People's Republic steps were taken to develop collective farming. The remaining landowners were dispossessed and disfranchised. The most important mineral product is petroleum obtained chiefly in the dists of Bacau, Huzar, Dimbovitza and Prahova. In 1947 1810000 metric tons of crude oil were produced but before the Second World War ann production had reached (1938) 6865000 metric tons although the labour used was less (23000 in 1938 and 50200 in 1947). There are over 2000 m of oil pipeline in R. Before the Second World War foreign capital was largely responsible for the exploitation of R's oil resources, but the post-war Communist Gov systematically took over the ownership of foreign companies. Other minerals include coal, salt, iron ore, gold and silver ore and mica. Industries of importance are flour milling, brewing, distilling, furniture making and the production of chemicals based on petroleum and lignite or coal. Before the Second World War Great Britain was R's biggest customer. In 1948 trade between R and Britain revived to some extent. R exported some 43000000 worth of goods to Great Britain and imported £1000000, but the bulk of her trade was done with the USSR and Bulgaria, Hungary, and Czechoslovakia. In June 1948 a law, effective upon pub, nationalised insurance, banking, mining, transportation, and telecommunication enterprises, as well as practically all manufacturing concerns of any importance. A state economic plan for 1949 envisaged an increase of 40 per cent in the total production of the country as compared with 1948, the development

of heavy industry being of prime importance. In 1941 an agreement between R and the U.S.S.R. provided for closer economic collaboration between the two countries. Rumanian Soviet companies called *Sovroms* were established. These gave the U.S.S.R. virtual control over all important Rumanian enterprises. In 1947 *Sovrompetrol* produced nearly 30 per cent of all Rumanian petroleum.

Race, Religion and Education.—Before the Second World War the racial divisions of the country were: Rumanians (Vlachs) 72 per cent; Magyars 8 per cent; Germans 4 per cent; Jews 4 per cent; gypsies 12 per

cent. In 1945, after that in Chernovitz (Chernowitz, Chernovits) had become part of the U.S.S.R. Church schools were put under state control in 1948. There were over 1800 primary and nearly 1000 secondary schools in R in 1945.

Constitution and Justice. The Rumanian People's Republic was proclaimed on Dec. 30, 1947. Elections for the Grand National Assembly in March 1948 gave 40 per cent of 415 seats to the Communist-controlled bloc. A new constitution was passed instituting gov. by a single chamber and a council of ministers, and a



MUNTANIA. TIMBERYIELDS IN AUTUMN

Rumanian Literature

cent. Ruthenians, Russians, Bulgarians and Lucks. During and after the war the number of Magyars, Jews and gypsies was considerably reduced in the case of the last two groups by persecution, and figures available in 1950 suggest that over 85 per cent of the pop. were Rumanians. About 70 per cent of the pop. belong to the National Orthodox Church. Of the rest the largest minorities are: Greek Catholic 10 per cent; Roman Catholic 8 per cent; Reformists and Lutherans 3.3 per cent. In Aug. 1948 a law "concerning the freedom of all religions" put all religious and religious teachings under state control. The state pays the clergy of the leading Christian denominations and Moslems, and Jewish communities receive a state subsidy. Education is nominally compulsory and free, but the percentage of illiterates is still high in the remote parts of Wallachia and Moldavia. There are universities at Bucharest (founded 1864), Jassy, Cluj, and Targul-Mures. The last-named

presidium. Women voted for the first time in the elections of Nov. 1946. Justice is administered through three appeal courts, thirteen criminal courts, sixty-three tribunals, and some 400 justices of the peace.

Communications. The state owns and operates all the main railways, owning 9622 m. in 1945. Total rail mileage in 1945 was 13,163. In 1944 the Rumanian Airways Company was incorporated in a Russian-Rumanian joint company. It had transported more than 12,000 passengers in 1944. There are services linking Bucharest with Warsaw, Istanbul and Belgrade. In 1945 Rumanian mercantile tonnage amounted to 962 tons, being still reduced to 100 tons by war restrictions by war losses and reparations. The State Navigation Society covering sea and Danube navigation was incorporated in a Rumanian-Russian joint company in 1945, called *Sovromtransport*. The peace treaty (1947) laid down that Danube

navigation should be free, equal, and open to all national, mercantile vessels and trade of all states. Galati is the timber port. Brazil deals primarily with grain and Constanta with petroleum.

Defence — Under the peace treaty of 1947 R was allowed a land army not exceeding 120 000 men, anti aircraft artillery up to 4000 men, an air force not exceeding 150 aircraft and a personnel of 8000 and a navy of up to 1 000 tons with a personnel of 500. In 1948 it was believed that the Rumanian army alone had a strength of 150 000. There is a naval school at Constanta.

History — The primitive civilisation of R can be traced back to the Neolithic age. Remains have been found in great number at Vodastra. The Roman period left its mark deep on the country and many towns and ruins have been identified. The period immediately preceding the conquest by the Romans belongs to those people known as the Daci or Getae (*g*) who occupied the country until the Emperor Trajan defeated their king Decebalus in A.D. 106 and their country became a Roman province known as Dacia. Roman colonists settled in the country and it became an exceedingly flourishing part of the Roman Empire. About A.D. 270 the Emperor Aurelian withdrew his garrisons but the Roman civilians remained. From the sixth to the twelfth centuries the country was invaded by various barbarians (Goths, Huns, Bulgarians and Magyars) almost obliterating the Daco-Roman inhabitants though remnants of Roman civilisation and the Roman language survived. The modern Vlachs are possibly a remnant of the original Daco-Romans mingled with the latter body of immigrants from Trans-Danubian territory. At the end of the thirteenth century Wallachia and Moldavia were occupied by a mixed race of Latins, Vlachs and Slavs. These two principalities developed separately. The Wallachian state was according to tradition, founded by Rudolf the Black known as the Black Prince in 1290 who finally established his capital at Curtea de Arges. Wallachia under Rudolph was still a vassal of the Hungarian crown but in 1330 the voivode or prince John Basarab the Great inflicted a crushing defeat on King Charles I of Hungary and enjoyed independence for just fourteen years, then Louis the Great asserted his supremacy. Of the more famous voivodes of Wallachia Mircea the Great (1386-1418) who fought so bravely against the Turks ended by being obliged to recognise their suzerainty. During the succeeding period the Wallachian princes became either allies of Hungary or under the rule of Turkey. For a short time the country became independent under Michael the Brave (1593-1601). Michael secured his own nomination as voivode and by his courage and genius united under his rule the three principalities of Wallachia, Moldavia, and Transylvania. For the first time since Trajan's conquest the whole of the original Dacia was complete as one kingdom. Subsequently, however, there was opposition to Michael's rule in Transylvania, and

the milk contents with the co-operation of the imperial general. Basti drove him out of the country. Michael appealed to the emperor who gave him funds and appointed him governor. In these circumstances Basti now helped him to expel Andreu Bathory who had secured control but later Basti treacherously murdered him. Matthias Basarab (1633-1644) established a certain amount of peace and prosperity and repulsed his rival Basil the Wolf of Moldavia. Bessrab's illegitimate son Constantine Sebastian (1644-8) was the last of the Basarab dynasty to rule Wallachia at his death Turkish



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A UN PLEASANT OF MARAMBIR

rule again governed the country. In 1463 the capital was moved from the old city of Puzhvishtea to Bucharest which became the seat of government. In 1497 the last of Moldavia had developed on much the same lines as Wallachia. The country recognised the suzerainty of Poland under the voivode Alexander the Wise (1401-1463) his grandson Stephen the Great (1458-1504) defeated the Poles (1461) the Hungarians (1467) and invaded Wallachia (1472) but his successor Bogdan acknowledged Turkish suzerainty. Demetrius Cantemir was the last of the national princes (1709-17) then followed the Enrirot period which lasted in both principalities till 1821. The voivodeship was sold to the highest bidder by the Turks and the holders were generally kanakariots (q.v.) often men of culture and intelligence, having most enlightened ideas. Nevertheless during this time the country suffered much misery and misrule both from its own princes and the greed of

Russia and Austria. In 1821 the Porte once more allowed them to elect their own rulers but Russia for a time prevented any serious reforms. The treaty of Paris (1856) gave the principalities the guarantee of the powers to preserve their existing privileges while still remaining under the suzerainty of the Porte. In 1858 it was decided that both Moldavia and Wallachia should have separate assemblies but that a central commission be established at Iocsham (Iokszany) for common justice and interest. Both assemblies were to elect their own prince—they chose unanimously Prince Alexander John Cuza (Jan. 1859) and thus the union was satisfactorily accomplished. In 1866 Prince Alexander was compelled to abdicate his reforming policy being unpopular with the landowners. Prince Charles of Hohenzollern-Sigmaringen (b. 1839) was elected in his place. Prince Charles (Carol) married (1869) Princess Elizabeth of Neuwied known in the literary world as Carmen Sylva. A new and more liberal constitution was adopted reforms were made in the army and railway construction was begun. An abortive rebellion broke out in 1870 due to R's sympathies with France and in opposition to a Ger prince further a financial crisis developed in connection with the railways and a failure to pay interest on the loan which was mainly held by Ger investors. Prince Charles threatened to abdicate but the elections of 1871 restored his gov. to power and the crisis passed. R played an important part in the negotiations between Russia and Turkey which ended in the Russo-Turkish war of 1878 and finally threw in her lot with Russia. The treaty of Berlin (1878) gave R her independence (ceding Bessarabia to Russia) and gaining the delta of the Danube and the Dobruddja. It was formally recognised as independent in 1880 and in 1881 elevated to the position of a kingdom. In 1889 the church of R was declared a separate national church. Domestic politics continued to be disturbed by religious disputes and peasant grievances. During the Balkan war (1912-13) R played a strong waiting game and on the outbreak of hostilities between the former allies Bulgaria and Greece plus Serbia she mobilised her army and compelled Bulgaria to consent to the terms of the treaty of Bucharest by which she gained the S. Dobruddja.

At the outbreak of the First World War R declared neutrality. Premier Bratianu the liberal leader and chief influence in Rumanian politics between 1900 and 1927 cautiously favouring the Allies and the court of the Central Powers. In Oct. 1914 King Charles died and was succeeded by Ferdinand. Regarding Transylvania and Bukovina which R wished to annex agreements were reached with Russia and R declared war on Austria-Hungary (Aug. 27, 1916). The Rumanian troops won Transylvania, but the Ger Army advanced from Silistria and on Dec. 6 entered Bucharest (see RUMANIAN FRONT FIRST WORLD WAR CAMPAIGN ON). In Dec. 1917 it was included in the agreement between

Germany and Russia to suspend hostilities. In Jan. 1918 friction between Russia and R in Moldavia led to a declaration of war from Russia but Russia was occupied with renewed hostilities with Germany. The Rumanian Premier Averescu signed the treaty of Bucharest with Germany, but later R declared war on Nov. 10. Bratianu returned to power. Rumanian deaths due to the war numbered 325,000 soldiers and 27,000 civilians. On Aug. 4, 1919 Rumanian troops entered Budapest retreating upon allied representations after much looting. Under the Populist Premier Averescu R signed the Little Entente (1921) with Czechoslovakia and Yugoslavia. There was drastic agrarian reform. In 1923 Bratianu was again in power and a new constitution was adopted attempting to establish fair elections by the introduction of the secret ballot. There was a treaty of friendship made with Italy in 1926. For him died in July 1927 and was succeeded by his five-year-old grandson Michael since his son Carol had renounced his titles in 1925 and been exiled. Bratianu's power was now apparently very great but in fact there was much unrest among the minorities and the peasantry and these factors contributed to the rise to power of the National Peasant party led by Maniu. Bratianu died in Nov. 1927 and in the elections which followed Maniu's party was returned the liberal strength falling from 293 seats to 13. In 1930 with Maniu's help Carol returned and the Council of Regents resigned. Carol became king from June 9 his son Michael becoming Crown Prince. R was hard hit by the world economic crisis. Maniu soon quarrelled with Carol and there was a swift succession of gov.s each arranging elections in its own favour under the electoral laws of 1926. In 1933 a non-aggression pact was signed with Russia. Ger influence in R became more marked being exercised partly by the intervention in gov. affairs of Codreanu's Iron Guard the Rumanian parallel to the Ger SS. This adopted antisemitism as a status not never far below the surface in R to gain popular support. When Iron Guard activities were renewed in autumn 1938 the king ordered the arrest of Codreanu and a number of other Iron Guard leaders and they were shot but this did not secure control of the guard's activities. In 1939 R remained aloof from the war but showed some pro-Polish sympathies. In March 1940 the Iron Guard was restored under Ger pressure. R was forced to cede Bessarabia and N. Bukovina to Russia in July. S. Dobruddja to Bulgaria on Aug. 21, and N. Transylvania to Hungary on Aug. 30. On Sept. 6, following a *coup d'état* by the Iron Guard Antonescu with Ger support formed a gov. and Carol was forced to abdicate in favour of his son and flee the country. Ger troops were stationed in R and the economy of the country was used to supply the Ger war machine. In revenge for the execution of Codreanu the Iron Guard arrested and executed a number of prominent Rumanians including Prof.

Jorga (q1), and then carried out a merciless anti-Jewish pogrom. Antonescu was forced to disband the guard, doubtless with the consent of his German overlords. R joined in the German invasion of Russia in 1941. More than forty Rumanian divisions took part, serving in the severe fighting of the Crimean campaigns, where their losses were very heavy. For a time they reconquered Bessarabia and N. Bukovina, and in Oct. 1941 a decree was issued incorporating Odessa and an area beyond the Dniester in R. By the end of 1944 Russia had won back all this territory. R's brief successes cost her dearly. Ploesti, Bucharest, Jassy, and Constanta were repeatedly bombed by the Russians, and in Dec. 1941 Britain declared war on her. From 1943 allied bombers attacked Rumanian towns from the skies. The war became extremely unpopular and Antonescu was compelled to exercise severe repressive measures. At the same time desperate efforts were made by the Germans to increase production in the oil fields. In Aug. 1944 the Russian counter-offensive reached Jassy and Constanta and an armistice was signed on Russian terms. King Michael, although virtually a prisoner of the Germans, taking a notable part in the events leading to the surrender (see further under EASTERN FRONT OF THE SECOND GERMAN CAMPAIGN IN THE SECOND WORLD WAR). Antonescu was imprisoned. There were a number of attempts at coalition gov., but in March 1945 the National Democratic Front with Russian backing assumed power under Groza, leader of the Ploughmen's Front, a Communist offshoot of the Peasant party. The National Democratic Front was nominally a left-wing coalition, but it was in fact Communist controlled. The Communists were a minority party in R., but Russian support soon assured them control of the country. Elections in Nov. 1946 at which the regulars were alleged to have been falsified gave 448 members to the Groza gov. and twenty-nine to the opposition groups. The opposition parties, the National Peasant party and the National Liberal party, were liquidated. Maniu was sentenced to solitary confinement for life. All pretence at coalition gov. ended when the Liberal members of the gov. were replaced by members associated with the Workers' party, the name given to the fused Social Democrats and Communists. The reconstituted gov. forced Michael to abdicate on Dec. 30, 1947. The National Assembly proclaimed it a republic on the same day. In March 1948 elections were held in which the Communists gained an overwhelming victory. A new constitution was passed, which by its terms consolidated the power of the Communists (see further under CONSTITUTION AND JUSTICE). A peace treaty had been signed in Paris in Feb. 1947. The frontiers were fixed as on Jan. 1, 1941 with the exception that Transylvania was restored to R. Reparations to Russia, to the value of 275,000,000, were to be paid over a period of eight years, but the Soviet Union later waived her claim to much of this. The

treaty contained clauses specifying that Rumanians should enjoy full personal liberties. In April 1947 the U.S.A. and Britain protested that the Rumanian Gov. had suppressed these liberties and had thus violated the peace treaty. R's foreign policy was closely in line with that of the U.S.S.R. and in 1949 she joined in the Soviet campaign against Tito. At home the gov.'s actions showed that it was the intention to establish a fully Communist R. and nationalisation on a large scale has been carried out. R. appears to be a complete satellite of the U.S.S.R. The regime has a powerful political police force at its disposal and W. observers reported the widespread and growing use of censorship and stern measures to enforce loyalty to the gov. It is certain that democracy as understood in W. Europe has never taken root in R. The condition of the peasant and of the urban workers had been improving steadily since the end of the nineteenth century, but much injustice and political corruption and discrimination had survived, and on these grievances the minority Communist party had thrived. The rapid collapse of the historical parties which had been based on W. European tradition was accomplished so easily, not only because Soviet power was available, but because so large a proportion of the pop. were politically ignorant.

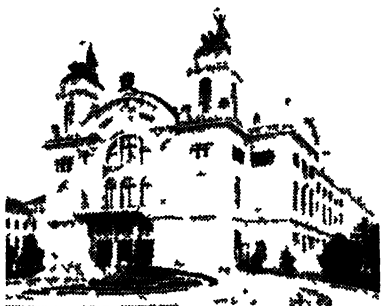
Language and Literature—The Rumanian language is a Romance language (see under ROMANCE LANGUAGES) curiously isolated among the Slavonic and Magyar speaking peoples. Therefore words of Lat. origin mingle with Bulgarian, Russian and Hungarian intertongues and even with the Turkish, Gik, and Albanian, and the Romance character of Rumanian has been much modified, particularly by the Slavonic loan words. On the other hand certain characteristics of the Lat. language have been better preserved in Rumanian than in any other Romance tongue, both in the vocabulary and in grammar. Rumanian has retained for instance a separate nominative accusative and genitive dative, as well as occasional vocative forms. A special feature of the language is an article suffix added to nouns. The Lat. alphabet is used (the Cyrillic was used until the nineteenth century) with certain signs for borrowed Slavonic sounds.

Early Rumanian literature consists of texts from the Slavonic and from the sixteenth to the beginning of the eighteenth century Slavonic influence is supreme though under the pressure of the Reformation tendencies leading towards a truly national literature begin to appear. Of importance are the chronicles of Moldavia by Nestor and Grigorie I, reaching down to 1594 by Miron Costin to 1662, and by Nechulce Costin (d. 1715) to his own date, of Wallachia, by Capitanul to 1688, by Popescu to 1720, especially by Prince Demetrius Cantemir (1710). The first trans. of the N. T. from Slavonic, appeared in Belgrade (1648), the first complete Bible was pub. (1688) by Rade and Serban Grozeanu, at the order of

Prince Cantacuzene. Under the influence of the Reformation a large mass of translations, sermons, verse paraphrases of the psalms, etc., was pub. during the sixteenth century and seventeenth century. During this period the liturgies, which were all in Slavonic, began to be trans., though the Cyrillic alphabet continued to be used. Of importance and interest are the trans. from Gk. Slavonic, and Magyar of lives of the saints, maxims and ethical treatises. The Lamanot period (1710-1830) marks the rise of Gk. influence. By this time Rumanian had become the official language of the church, and in 1727 became the language of the law courts. Rumanian trans. of the Gk. fathers of the church and much theology appeared. During and after the Revolutionary period the growth of nationalism in it influenced and was influenced by a group of writers, who included Peter Maior, George Simca and George Lazar. They worked to latinise their language, and to incorporate much of the folk literature into forms which owed much to W. European and especially Fr. influence. Much imaginative literature of foreign origin, and modelled on Fr., It., and Ger., marks a transition. A great deal of foreign dramatic literature of Molière, Schiller, Victor Hugo, etc., was trans. and staged. Of popular poets may be mentioned Vasile Aaron, Ion Barak, and the three Văcărescu, Enaki (Janachie) Alceu, and especially Joan, whose beautiful and mystical poems, pub. in a collection (1898) marked a Rumanian renaissance. Vasile Carion is also one of the great Rumanian poets. The modern period dates from 1850, and begins with the adoption of the Lat. alphabet and the Neo Lat. movement to wipe out all Slavonic and other words, and the barring of the older literature. Of outstanding influence in this movement is Ion I. I. Radulescu, whose disciples Bolintineanu and G. Alexandrescu are the most important of the patriotic writers of verse. Mihail Eminescu, the greatest of Rumanian poets, steeped in medievalism and mysticism, a master of the language and a lover of the popular folk songs and tales, was a leading figure in the literary circle called the *Jumina*. The naturalist novel never had a very strong hold on Rumanian literature, although I. Iliescu (1819-65) has found successors in Zamfirescu and the war novelist, Minulescu. Country and peasant life supply the chief stuff of fiction, and folklore remains the traditional source of Rumanian literature unaffected by war and invasion. Before the Second World War Fr. influence on Rumanian literature had replaced the paramount Ger. influence of the early twentieth century. It revealed itself in a succession of psychological and symbolist novels and poems by a new school of young authors, few of whom had established an outstanding individual reputation by 1939. The sparse literature of the period after 1945 shows strong Russian influence, both in subject-matter and treatment. There has been an increase in sociological writing, fiction and poetry, where not

actively propagandist, show a greater reliance on folk literature than was displayed by writing done when contact with W. Europe was easier.

Art—Rumanian church architecture was until the nineteenth century, predominantly Byzantine, though in some parts of the country, such as Transylvania, Magyar and Ger. influences have produced buildings with certain Gothic tendencies. The richly decorated interiors and the icon paintings follow the Byzantine pattern. Metal work decoration is lavishly used and the general impression is one of brilliance and clarity. The eighteenth century interior of the monastery church at Văcărescu and the impressive sixteenth century monastery church at Humorului are good examples of Rumanian art of this type. Ger. influence where it exists is more noticeable in the



Rumanian Legation

III. NATIONAL THEATRE, CLUJ

exterior of church buildings. It was affected by the classical fashion in architecture which spread across W. Europe in the early nineteenth century and her later buildings are largely copies of Fr. and Ger. styles. Building between 1910 and 1939 showed Amer. influence. Rumanian painting also followed the Byzantine tradition until the late eighteenth century, modern Rumanian art owes much to Fr. Impressionism. The twentieth century produced a school of Rumanian painters who, while strongly influenced by Fr. tendencies, combined these with ideas and styles taken from Rumanian peasant art which is notable for its exotic, almost oriental, colour combinations. Prominent modern Rumanian artists include I. Theodorescu, I. Andreescu and the sculptor I. Jalea. Modern Rumanian pottery and glass work is remarkably fine, and incorporates many folk designs.

Music—R. has a rich store of folk music, which is mainly Slavonic in character, but shows Magyar and Gk. influence. In the nineteenth century a national school of music is growing up, which included G. Kiria, A. Castaldi, and G. Enescu. They followed the Fr. tradition, but later composers, such as M. Mihalovici and I. Perlea were more individual in

their compositions and relied more for their inspiration upon folk music themes. R is one of the centres of gypsy music, and Rumanian light music in particular owes much of its charm to gypsy influence.

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Rumanian Front, First World War Campaign on. The sympathy of Rumania was with the Entente from the outset of the war, but Ger. successes on almost every front, and particularly within easy reach of her frontier imposed great caution upon her. However, on Aug. 27, 1916, she declared war on Austria-Hungary. Rumania had coveted Transylvania for a long time and now her troops crossed the Carpathian Alps into the ter. driving the enemy before them. The Bulgarians, however, were preparing for a descent on Rumania and on Sept. 3 successfully crossed the Danube and captured over 21,000 Rumanians. The Rumanians were reinforced by a small body of Russians but they were no match for the Bulgarians and were compelled to withdraw along their whole line. More trouble was in store for the Rumanians who had penetrated into Transylvania for a Ger. army was soon concentrated against them. On Sept. 28 a battle was fought at Hermannstadt (Sibiu) the Ger. practically destroyed their enemies, all their artillery falling to them. The remnant of the Rumanian force retreated hurriedly over the Carpathians. They were again defeated by the Ger. when covering Bucharest for all practical purposes the Rumanian Army ceased to exist at the beginning of 1917. The remnant was reorganised under the Fr. and later

fought more successfully in conjunction with Russian forces. See also **WORLD WAR FIRST**.

Rumba, dance originating in Cuba, deriving from the *habanera*. It shows Sp., negroid and Amerindian influence. In its primitive form it was in crotic dance. In ball room form it was introduced into the U.S.A. between the two world wars and became popular in Britain during the Second World War.

Rumbeke, small Belgian tn. in the prov. of W. Flanders, 9 m. N.W. of Courtrai, engaged in agriculture and manuf. of linen. Pop. 7700.

Rumelia, Eastern, dist. of S. Bulgaria, created by the Berlin Treaty of 1878 which directed it to remain under the direct political and military authority of the sultan with autonomous administration. In 1885 however it was incorporated in Bulgaria. Its area was considerably increased on the termination of the Balkan war in 1913. It included the present depts. of Lovdiz, Stara Zagora and Burgas. The biggest tn. in the dist. is Plovdiv, Burgas is the chief port. It is the most productive part of Bulgaria, its roses being especially noted. Area 17,375 sq. m. pop. 2,163,300.

Rumex, genus of herbaceous plants (family Polygonaceae). It includes a number of common and uncommon docks which hybridise freely with one another and also the sorrels of which *R. scutellatus* L. Sorrel is cultivated as a pot herb and salad plant.

Rumford, Count, see THOMSON, SIR BENJAMIN.

Rumford Falls, tn. in Oxford Co., Maine, U.S.A. on the Androscog. R. 62 m. N.W. of Portland. Close by are the R. K. where the Androscog. R. falls about 115 ft. 1 m. 5726.

Ruminants, ungulate mammals which chew the cud. The paunch is filled with bulky food which is made into small pellets or boluses and passed to the second stomach where the fine portions after sitting are carried to the third stomach the rest being returned to the mouth to be masticated until sufficiently fine for assimilation. (Cattle, sheep, goats, deer, antelopes, giraffes and camels are among the R.)

Rummy, card game played by seven persons and has a large number of variations. It is always based on the principle that the player attempts to obtain from the hand dealt to him and from the pack certain scoring combinations (either of the same denomination (e.g. three or more kings) or in sequences of the same suit (e.g. 5, 6, 7 of hearts).

Rumonsch, see ROMANSCH.

Rump Parliament, see LONG PARLIAMENT.

Runciman, of Doxford, Walter Runciman, first Viscount (1870-1949), Brit. statesman and shipowner, b. at S. Shields (eldest son of the first Baron R.). After leaving Trinity College, Cambridge, he entered his father's shipping business. In 1899 he was returned as Liberal M.P. for Oldham. In the 'khaki' election of 1900 he lost his seat, but in 1902 was elected

for Dewsbury. In Campbell-Bannerman's gov., in 1905, he was parli. secretary to the Local Gov. Board. This was soon followed by the financial secretaryship to the Treasury. He entered the Cabinet in 1908 as president to the Board of Education. From 1911 until 1914 he was president of the Board of Agriculture and was then promoted to the critical position of president of the Board of Trade. When in 1921 he won the Swansea seat he and Lloyd George were the only two survivors on the Liberal side of the chief members of the pre-war Liberal gov. R. accepted a peerage in 1937 before the death of his father who had himself a peerage conferred on him in 1938. In the late summer of 1938 he was offered the responsibility of adjudicating on Ger. and Czech claims in the Sudetenland, a thankless and impossible task (see also *under* CZECHOSLOVAKIA). In recognition of his work, R. was readmitted to Cabinet rank as lord president of the council in office which he held until the outbreak of war in 1939. R. returned to the tasks of politics the certainty of commerce in business though his place in the latter sphere was recognised by his election in 1926 as president of the Chamber of Shipping. He wrote *Liberalism as a Fact* (1927).

Runcorn, port and urban dist. of Cheshire, England, on the Mersey, 27 m. S.W. of Manchester. It is on the Bridgewater and the Manchester Ship canals, and has large docks, a commodious number of vessels. It manufactures fine leather and has shipbuilding works. The Mersey near this town is crossed by railway and transport bridges. Pop. 28,500.

Rundle, Elizabeth, see CHARLES, Mrs. ELIZABETH.

Rundstedt, Karl Rudolf Gerd von (b. 1876), Ger. officer descended from a Brandenburg family. R. first joined the 3rd Infantry Regiment and later the 171st. He served in the infantry up to the rank of captain. He then joined the general staff. In 1914-15 he was chief of staff of the 15th Ger. Corps, and then went to Turkey to help reorganise that country's general staff. These appointments though important did not carry promotion and he began and ended the war as a major. As *Oberst* and chief of staff to the 3rd Cavalry Div. he put down the Socialist uprisings of Nov. 1918 with machine guns and mortars. As military commander of Berlin he was instrumental in arresting Braun's Socialist gov. of Prussia. On July 20, 1922, as full general in charge of Corps Area I (Berlin) he carried out von Papen's coup d'état against that gov.

In 1939 R. was probably the only Ger. general who could capably handle a full army group and he proved that in Poland where he broke down the Polish triangular resistance at Kutno through his S. push. He commanded the central army group during the campaign in France (1940), and was the first to cross the lower Somme. In Russia he commanded the S. group, including Rumanian and Hungarian divs. in its speedy conquest of the Ukraine. When von Bock failed in front of Moscow R. was called

on to conduct the ensuing disengagement operations, and fall back on a stable winter line. The year 1942 saw him commander in chief in France, Belgium, and Holland with a certain amount of influence on the It. theatre (African) of operations. In July 1941 he took part in the Hitler ordered courts of honour which condemned a number of Reichswehr officers to death by strangulation for their part in the bomb plot against Hitler's life. The Ger. defence measures after D day cannot be regarded as his work for his advice was to avoid defence from the beaches and to carry out prolonged resistance in depth with frequent counter-offensives, but his advice was rejected and he was superseded by Rommel and von Kluge who failed catastrophically. The failure and suicide of both brought him back as commander in chief and his next notable exploit was his Ardennes counter-offensive of Dec. 12, 1944, which however was soon defeated by E. M. Montgomery and Gen. Patton. Defeated both W. and E. of the Rhine in 1945, he was superseded by von Kesseling. In Aug. 1948 it was announced that it would be tried as a war criminal, but on May 5 in the following year it was stated that owing to his illness the charge against him would be dropped and shortly afterwards he was released from custody. R. was the last military leader within the Wehrmacht who can be said to rank as a general with soldiers like Moltke and Schlieffen and the only Ger. general whom his operations in the Second World War added to the essence of Ger. strategy: the continuous offensive.

Runeberg, Johan Ludvig (1804-77), Swedish-Finnish poet, b. at Jakobstad. He studied at Vasa and Åbo Univs. and in 1837 became lecturer in lit. and later in Grk. at Börså. He founded the *Helsingfors Morgonblad* (1832), contributing to it many of his poems and tales. Among his finest works are the idylls *Fågelskyllarne* (The Hunters, 1832), *Hanna* (1836), *Julqällan* (Christmas Eve, 1841) and romances *Nadeschda* (1841) and *Kung Ulfar* (1844). His epic *Länrik Stål Sagan* (Stories of Länrik Stål 1818-1860), dealing with the War of Independence against Russia (1808-9) is perhaps his most famous work and the preface to *First Land* has been adopted as Finland's national hymn. His *Kings in Salamis* (1863) is a notable tragedy. R. is also famed for his psalm book (Lutheran) which contains nearly seventy of his own poems. *Selected Poems* in Eng. trans. by Magnusson and Palmer was pub. in 1878. See also by R. Hedvall 1951.

Runes. This term connected with the old Germanic root *ru* and the Gothic *runa*, meaning 'mystery', 'secret', 'secretly', indicates an ancient script which may be considered as the 'national' writing of the pre-Christian Germanic tribes though R. although in limited use, lingered on for a long time after the introduction of Christianity and their use for charms and memorial inscriptions lasted into the sixteenth century (in some outlying Swedish regions even 'down to our own

times'—O von Kreisen) The origin of the name is probably due to the fact that like all primitive peoples, the Teutons attributed magic powers to the mysterious written symbols.

The R were used chiefly for inscriptions (q.v.) of which there are about 4000 extant notably the rock inscription at Oesterrotland (c. A.D. 900), on memorial stones, rings, medals (the characteristic *bracteates* or circular pendants of thin gold), brooches, coins, hilts and blades of swords, perpetual calendars (known in Norway as *Primsstene* and in Denmark as *Rimsstene*) crosses, etc. There is no certain evidence of wide literary use of R in early times, but some scholars hold that the R was widely employed for all kinds of secular documents. The MSS extant however are very rare and rather late. The earliest MS version of Old Eng. R is now MS 17 in the library of St John's College Oxford dated 1170, the Old Dan. *Codex Runicus* a legal MS dates from the end of the thirteenth century, the so-called *Iasti Danici* belong to c. 1345. Other important Runic MSS are the *Codex Sangallensis* 875 at St Gallen, the *Codex Salisburgensis* 110 at Vienna, a Runic prayer book, etc.

It seems most probable that the R derived from a N. Etruscan alphabet (see ALPHABET) and originated in the second or first century B.C. The following main varieties of R may be distinguished: (1) The Early or Common Teutonic or Primitive Norse—about 100 inscriptions, mainly from the third to eighth centuries, v. the Runic alphabet also called *futhark* (from its first six letters) consisted of twenty-four letters, divided into three groups known as *astur* and seems to have covered adequately the sounds of the early Germanic forms of speech. (2) The A.S. or Anglian R brought to these is in the fifth-sixth centuries. The Early Teutonic R were not sufficient to represent the rich O.F. vowel system and the *futhark* was first increased to twenty-eight letters and in the middle ninth century to thirty-three letters, also the phonetic values of some characters have changed. Two of the A.S. R (the *thorn* and the *wen*) lingered on in the O.L. alphabet. (3) Nordic or Scandinavian varieties—the parallel linguistic development of the Scandinavian languages produced a result directly opposite to that of O.F. from about A.D. 800 the Scandinavian R was reduced to sixteen letters, we can distinguish a few varieties such as the Dan. (also used in S.W. Sweden), the Swed. Norwegian, the Hælingic P. the Mæra R. (which was a sub-variety of the Swedish Norwegian short system, the Dotted R or *Stungnar Rúnir*, etc.) There were also various Runic cryptic varieties such as *haldrunir* or 'tent runes', *kristrunir* or 'twig runes', various kinds of 'bind runes', and so forth.

See C. Stephenson *Handbook of the Old Northern Runic Monuments* 1884, L. I. A. Wimmer *Collectio Runologica Havnensia*, 1915, M. Cahen, *Origine et développement de l'écriture runique*, 1923, B.

Dickins, *The Runic Inscriptions of Mac showe*, 1930 H. Sletting and H. Falk, *Scandinavian Archaeology*, 1937, L. R. Jacobson and others, *Runic Inscriptions of Denmark*, 1947, J. G. Lévyier *Histoire de l'écriture* 1948, D. Düringer *The Alphabet* (2nd ed.) 1949.

Runge, Philipp Otto (1777-1810) Ger. painter, b. in Wolzst. Pomerania. He studied in Copenhagen and Dresden. Influenced by the Romantics, he is noted for the idealism of his portraits, although his figure work was plainly classical.

Runjeet-Singh, see RANJIT SINGH.

Runner, long sub-aerial shoot rising in the axil of a radical leaf and producing a new plant at its extremity, when the connecting shoot dies. A familiar example is the strawberry plant.

Runners, Scarlet, see BLANK.

Runnimede, or **Runnymede**, meadow on the Thames near Igham in the co. of Surrey, England, where the barons forced King John to sign Magna Carta on June 15, 1215. It was presented to the National Trust in 1931.

Running and Hurdling Running is divided into track and cross-country running. Track running (or further be subdivided into sprinting, middle and long distance running). The two main sprints are the 100 and 200 yds. and in all-out effort during the whole of the race is necessary. The term 'sprinting' means the action of a runner when moving at top speed, and can seldom be maintained for more than 300 yds. In such short races it is necessary to get a good start as possible and the quickest method is universally regarded as a crouching start, starting blocks being used to gain impetus. Middle distance running begins roughly with the quarter mile and extends to the 3 m. In the quarter mile race there are two differing points of view as to the way the race should be run. The first is that the runner should go almost all out for the first half of the race, then slow down to succumb in order to make a final effort over the last 100 yds. The second is to run in even paced race all the way with a strong finish. In the half mile a strong start and finish are very important factors and a fast but steady run in the intermediate stage. The time race is the next popular of the middle distance events and the four main requisites are stamina, judgment, speed and style. A first class mile will do the first quarter mile in about 1 min. the next two quarters a few sec. slower and the last half is fast as the first. The ambition of every mile runner is to be the first man to do a 4 min. mile and the fastest time recorded so far is 4 min. 14.5 sec. Long distance running covers distances from 3 m. to 26 m. 385 yds. (the Marathon distance). A long distance runner needs a strong heart and lungs and plenty of stamina. The main object of style is to eliminate all unnecessary effort.

Hurdling—Although running and jumping are mentioned in Walker's *Manly Exercises* (1834) the two sports were not combined into the one hurdling event until the first Oxford and Cambridge meet

ing in 1864. There was then a steepie chase, later replaced by a 2 m flat race, and also two hurdle races over 120 and 200 yds. The latter was abolished in 1865, but a 200 yds low hurdle race was introduced in 1922. World hurdling records are recognised for the 120, 220, and 440 yds, and the 110, 200, and 400 metres. The standard high hurdle for the 120 yds is 3 ft 6 in in height, and 4 ft in width, and the ten flights of hurdles are placed at intervals of 10 yds with 15 yds from scratch to the first hurdle, and from the last hurdle to the finish. The 220 yds low hurdle race is run over ten flights of hurdles, 2 ft 6 in in height, and spaced at intervals of 20 yds. The height of the hurdle in the 440 yds race is 3 ft, with a distance of 40 yds between each hurdle with 50 yds from scratch to first hurdle and 30 yds from last hurdle to finish. The straight leg method of hurdling is now universal the advantage being that it reserves the running attitude, and makes the hurdle race a sprinting more than a jumping race. There are two types of hurdles. In important events a heavy hurdle is used, where this hurdle is not used a competitor knocking down more than two hurdles is disqualified. For R and H records see *ATHLETICS* and *OLYMPIC GAMES*.

See *Athletics* by members of the Achilles Club, 1938, 1945.

Runyon, Alfred Damon (1884-1946), Amer author and humourist b at Manhattan, Kansas. He became a journalist, but made his name in short story writing. He gave unique grotesque portrayals of the types of the New York underworld, using all the resources of New York slang to add humour and colour to his situations. His pubs include *Gyps and Dolls* (1932), *The Best of Runyon* (1935), and *More than Sanehand* (1937).

Rupee (Sanskrit *rupya* silver), standard coin of India worth 16 annas (1 anna 12 pies). The value varies, but from 1899 has been about 1s 6d. A lakh (lac) of Rs contains 100 000 Rs, a crore 10 000 000 Rs.

Rupel, riv. of Belgium formed by the confluence of the Dyle and the Nethe near Rumst 10 m S. of Antwerp. After a short course of about 80 km it falls in the Scheldt opposite Rupelmonde. The R. gives access from the Scheldt to the maritime canal of Brussels. On its banks are situated Niel, Boom, and Ichagen, all having important brick kilns.

Rupert, Saint (d c 720). Ger saint possibly of Fr or Irish descent. As bishop of Worms he evangelised S Germany. He founded the great abbey of St Peter at Salzburg, and was the first archbishop of that see. He is venerated as the apostle of Austria and Bavaria.

Rupert of Bavaria, Prince (1619-42) third son of Frederick V, elector palatine and titular king of Bohemia by the Princess Elizabeth of England, b in Prague. He served Charles I at Edgehill and Chalgrove field and proved an ingenious but erratic cavalry leader. After taking Bristol he obliged the enemy to raise the sieges of Newark and York,

but his impetuosity at Marston Moor and Naseby was disastrous. Shutting himself up in Bristol, after a short siege he surrendered, and was dismissed the king's service. After the death of Charles I he became commander of that part of the fleet which adhered to Charles II and, narrowly escaping Adm Blake, sailed to France and selling his ships, joined Charles II at Versailles. Later he served in the navy against the Dutch. His naval tactics, though less well known were superior to his military. Devoting his time mostly to scientific studies till the Restoration, many useful inventions resulted, among them the compound called Prince's metal he also introduced zinc-ointments into England. He was an active member of the R and of trade and he was one of the chief founders of the Hudson's Bay Company. See lives by J Clough, 1931, C Wilkinson, 1931 and M Irwin 1939.

Rupert's Land, see HUDSON BAY.

Ruphea (Anc. Alphus), chief riv. of Peloponnesus rising in the S. M. of Arcadia and flowing through Elis westward past Olympia to the Ionian Sea. In its passage through the cavernous limestone of its early course it often disappears underground. The Greeks considered that at its mouth it again disappeared under the sea to reappear in the Syracuse of Sicily in the fountain of Arcthusa. Hence arose the myth of the river god Alphus pursuing the nymph Arcthusa beneath the water.

Rupia, form of skin eruption characterised by the formation of blebs containing a serous fluid which gradually becomes purulent. The blebs dry up to form dark brown conical scabs. The crusts are easily detached and there is a tendency for blebs to re-form so that the scab ultimately takes on a stratified appearance. The disease is a manifestation of secondary syphilis and occurs especially in debilitated patients. Treatment consists of the administration of potassium iodide and generalised antisyphilitic measures such as injection of arsenic, bismuth and penicillin.

Ruppin, Neu, tn in the former prov. of Brandenburg Germany on Lake H. 48 m N.W. of Berlin. It is engaged chiefly in the cotton and woollen manuf. Pop 18 000.

Rupture, see HERNIA.

Rupununi, dist of Brit. Guiana (q.v.) lying S. of lat. 5° N. Area 40 772 sq m or 1 per cent of the total area of Brit. Guiana. The dist is named from the river which flows through the populated savannah and is the connecting link to the coast. Except for the savannahs bordering the R. and the Takutu and Maitum R., the whole dist is covered with dense forest. The savannahs cover about 6200 sq m. Generally speaking they consist of low gravelly hills and intervening flats of white clay or sand with occasional *piapi* swamps. The so-called lake in the savannah known as Annuku, is said to be the site of the legendary El Dorado which fired the imagination of Raleigh and the conquistadores (see EL DORADO). The main int.

ranges are the Pakaraima the Kanuku and the Akirai. The main rivers are the Essequibo Berbice and Corentyne (see BRITISH GUIANA). The Rupununi R. is a trib. of the Essequibo, flows through the populated area of the dist., and is not impeded by falls and rapids. Bon Succes is the gov. station in the savannahs. It has a small pop. of Amerindians, some Eurot. and other ranchers and settlers, and a few migrant miners and workers of forest products. An Angl. mission was estab. in 1831. Settlers settled there late in the nineteenth century. A plan to settle Jews in the dist. as an alternative to the limited absorptive capacity of Palestine was examined by the Colonial Office in the early 1930s but proved unacceptable.

Rural Dean, see under DIAN.

Rural District see under LOCAL GOVERNMENT.

Rural Institutes, see under WOMEN'S INSTITUTES.

Ruremonde see ROIMOND.

Rurik (d. 879) traditional founder of the Russian Empire. He is variously described as a Russo-Varangian or as a Viking from Sweden. With his followers he invaded E. N. Russia in 862. After the death of his two brothers Rur's power was supreme. He eventually estab. his cap. at Novgorod which became the centre of a strong state extending into central Russia.

Rurki or **Roorkee**, tn. in the Saharanpur dist. United Prov. India (10 m. N.E. of Meerut). The Indian Engineering College is situated here. Pop. about 20,000.

Rusadir see RUSSIA.

Rusbrock, John, see RUSSELL, JAMES VAN.

Ruscus (Butcher's Broom), genus of evergreen shrubs with flattened leaf-like evergreen branches and drooping flowers followed by berry-like fruits. *R. aculeatus* is the only Brit. species.

Rush, see RUSSES.

Rush, seaside resort 15 m. from Dublin. It is also noted as a market gardening centre and for bulb growing. Pop. 16,000.

Rushden, manufacturing tn. and urb. dist. in Northamptonshire, England 4 m. E.S.E. of Wellingborough. Boots and shoes are manufactured. Pop. 16,400.

Rushen, par. in the S.W. of the Isle of Man, England 12 m. W.S.W. of Douglas. Pop. 4,000.

Rush Nut, see CYPRESS.

Rush Toad, see WATER JACK.

Rushworth, John (1612-90) Eng. historian, b. in Northumberland. He studied at Lincoln's Inn and was called to the Bar in 1647. It is noted for his *Historical Collections* (1659, 1701) compiled from shorthand notes taken down at actual meetings of the Star Chamber, Exchequer Chamber and Parliament and covering the period down to 1648. In 1640 he became assistant clerk to the House of Commons and was frequently employed as messenger between Charles I. and Parliament. He was secretary to Lord Fairfax (1643-48) and gave Parliament news of the army actions. This he continued to do until the end of Crom-

well's Scottish campaign. He sat for Berwick in Parliament five times and was agent for Massachusetts under Charles II.

Rusicada, see PHILIPPINES.

Rusizi, riv. of Belgian Congo which discharges the waters of Lake Kivu into Lake Tanganyika. It forms the W. boundary of Ruanda (round length 75 m).

Ruskin, John (1819-1900) Brit. author and critic, son of an Edinburgh merchant in London. His upbringing was unusually strict. From childhood he was



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JOHN RUSKIN

encouraged to read good literature and write and draw and to appreciate the beauties of nature. Drawing he subsequently learnt under Copley Fielding and Harding. He studied at King's College, London and then in 1836 went to Christ Church, Oxford. Three years later he won the Newdigate prize for Eng. verse. Ill health in 1840 compelled him to go abroad but he returned to Oxford in 1842 and took his degree. He had already contributed articles to sev. magazines but he first became widely known in 1843 when he pub. the first vol. of *Modern Painters* in which he came forward with a defence and appreciation of the later style of Turner. The second vol. pub. in 1846 attracted even wider attention. The third and fourth vols. appeared in 1856 and the fifth and last in 1860. He married in 1848 Euphemia Calmeyer Gray, but the

marriage was owing to the characters of both parties and the interference of R's mother (extremely unhappy). In 1855 his wife obtained a decree of nullity in an undefended suit and married Millais. R's pub's had already made him famous, he was on intimate terms with many great literary and artistic personages, including Millais, Watts, Carlyle, T. P. and the Brownings. In the autumn of 1853 R delivered a course of lectures at Edinburgh on architecture and painting. He had in 1849 issued *The Seven Lamps of Architecture* in which he laid down the laws that should govern that art. The seven leading principles he declared were sacrifice, truth, power, beauty, life, memory and obedience. In 1851-53 was pub. *The Stones of Venice* illustrated by himself. In this work R laid down the principle which coloured all his artistic criticism: maintaining that good architecture and art though it need not be ecclesiastical must be religious in spirit. Other works of this period were *Notes on the Construction of Sheepfolds* (1851), *The Political Economy of Art* (1857), subsequently renamed *A Joy for Ever* (1857), *The Elements of Drawing* (1857), *The Two Paths* (1859) and *The Elements of Perspective* (1859). He was by this time accepted as the greatest authority on art in England and his pronouncements undoubtedly hastened the recognition of the artistic value of the works of Turner and the Pre-Raphaelites. R at the beginning of the sixties was as much interested in economics and social reform as in art and devoted much time to these though his conclusions were rarely orthodox. He attacked materialism and the dismal science of political economy. He thus reinforced the philosophy of Carlyle. His next works were *Unto this Last* (1862), *Sesame and Lilies* (1863), *The Ethics of the Dust* (1866) and *The Crown of Wild Olive: Three Pictures in Words* (Traffic and War) (1866). In these pub's R showed himself in ardent critic of modern civilisation and the prophet of a spirit of regeneration. From 1853 he lectured all over the country on art and economics and architecture. On the death of his father in 1864 R inherited a fairly substantial fortune out of which he gave generously. He had many pensioners; he assisted struggling artists and gave money for Miss Octavia Hill's housing campaign as well as gifts of valuable pictures to institutions. In 1871 he moved to Brantwood, Coniston Lake, his last home. He pub. monthly for workmen *Lancashire* in which much of his best work appears and in 1871 founded the Guild of St George. He was first Slade prof. of art at Oxford from 1870 to 1879 and he again occupied the chair from 1883 to 1889. From 1884, he pub. from time to time *Præterita* an autobiography, which however was never carried beyond 1890. It throws valuable light on R's religious development. His health gave way in 1878, and after this year he had occasional attacks of brain fever. An ed. of his works was ed. by F. T. Cook and A. Wedderburn (1903-12). See lives by A. C. Benson, 1911, J. Morley 1917,

R. H. Wilenski 1933, D. Leon 1949, P. Quennell 1949, also *The Order of Release* (letters ed. by Sir W. James), 1910.

Ruskin College, Oxford, Brit. educational institution founded by two Amers., Walter Vrooman and Charles Beard in Feb. 1899. The college originally known as Ruskin Hall was designed to afford higher liberal education for working men and women and particularly for those associated with trade unions and other working class organisations and to be free from all sectarianism either in religion or politics. The college has two main groups of studies: the social studies course includes economics, politics and social history and the arts course is based on Eng. literature with subsidiary Eng. hist. and a foreign language. There are approximately 100 students (1950) the great majority of whom live in the college buildings. The main college building is in Wiltam Street, Oxford, and there is a hostel for first year men students and another for women students at Headington. There are numerous scholarships to the college provided by the college itself, by trade union and other working class organisations and by local education authorities. A correspondence dept. exists for the benefit of non-residents who wish to take such courses.

Russell, Russell

Russell Family, famous Eng. family. The barony dates back to 1330. Branches of the family held the titles of Earl Russell and Lord Amethall. In 1817 the family is notable for its Unitarianism and besides those members to whom special articles have been devoted mention should be made of the following: *Francis fourth Earl of Bedford* (1533-1641) took part in driving the Turks and built the square of Covent Garden; *Sir John* (fl. 1440-60) Speaker of the House of Commons and grandfather of first Earl of Bedford; *John first Earl of Bedford* (1480-1555) *William first Duke of Bedford* (1613-1700) sat for 14 years in the Long Parliament. See Gladys Scott *Thameson: Life in a Noble House 1611-1700* 1937. *The Russells in History 1600-1771* 1940 and *Family Background* 1947.

Russell, Alexander (1811-76) Scottish journalist b. in Edinburgh. He became editor of the *British Liberator* (1839). In 1942 he went to America there editing the *Life Herald* and a new paper in Kilmarnock (1844). R joined the staff of the *St. James* under Mulart (1845) at Edinburgh becoming editor (1848). The paper began to appear daily for 1d (1855) instead of only twice a week. R was an ardent liberal and his paper championed the Anti-Corn Laws League and helped to secure Macaulay's election to Parliament in 1852. He popularised journalism while maintaining a high literary standard.

Russell, Arthur Oliver Villiers and **Odo William Leopold**, see ARTHUR BARRON. **Russell, Bertrand Arthur William**, **Russell, third Earl** (b. 1872) Brit. philosopher and mathematician b. at Trillick, second son of John Viscount Amberley,

and grandson of the first earl. Educated privately and at Trinity College, Cambridge, where he obtained a first class in mathematics and moral sciences. R served for a year (1894-95) as attaché at the Brit. embassy in Paris. In 1899 he was elected fellow of Trinity College and in 1903 he pub. *Principles of Mathematics*. Having been appointed lecturer in 1910, R collaborated with A. N. Whitehead in the pub. of *Principia Mathematica* (1910-1913). In 1914 his out-poken pacifism caused him to be deprived of his lectureship and refused a passport to the U.S.A. where he had been offered a similar post at Harvard. Four years later R was condemned to six months imprisonment for a pacifist article in *Tribunal* and while serving his sentence he wrote his *Introduction to Mathematical Philosophy* (1919). R succeeded his brother as earl in 1911 but his never used the title. Among his other pub. are *The Philosophy of Matter* (1900), *A B C of Atoms* (1923), *A B C of Relativity* (1923), *An Outline of Philosophy* (1927), *Scientific Essays* (1928), *The Scientific Outlook* (1931), *Power as a Social Analysis* (1938), *An Inquiry into the Meaning of Truth* (1940), and *A History of Western Philosophy* (1945). R is a original and independent thinker with a fine literary style. He calls his own philosophy 'Logical Atomism' in which he combines philosophy and mathematics. He is a psychological reformer stressing the value of creative rather than pre-set impulses. See also POSITIVISM, LOGIC.

Russell, Edward, see ORRORD, EDWARD RUSSELL JAMES.

Russell, George William (E.) (1867-1933). Irish poet, b. at Lurgan co. Armagh and educated at Rathmum School. He passed to the school of art and practised painting. R became leader of a circle that pub. the *Irish Theosophist* in which his first poems afterwards pub. as *Harmonies*, *Songs by the Way* (1894) and *The Earth's Breath* (1897) appeared. He attached to one poem the signature 'Tom' which was printed Y and how was afterwards always known by this pseudonym. He and W. B. Yeats were known as the leaders of the Irish literary revival and though Yeats overshadowed him 'F' wrote a number of poems of remarkable lyrical beauty much influenced by his study of E. mysticism. In 1897 Yeats recommended him to Horace Plunkett and R, who was working as an indentured in Pim's drapery, gave up that post and went bicycling through Ireland interviewing the rural pop. He devoted a great deal of his life to the promotion of agric. co-operation. *The Irish Statesman*, a venture of his own, lasted from 1923 to 1930. Some of his pub. include *The Vale of Knowledge* (1903), *Deirdre* (play, 1907), *Ideals of the New Rural Society* (1911), *Salvation* (1916), *Standish O'Grady* (1920), *Enchantment and other Poems* (1930). R was a pioneer of the Dublin Abbey Repertory Theatre. See study in J. Eglington, *Irish Literary Portraits* 1937.

Russell, Henry (1812-1900), Eng. vocalist

and musical composer, b. at Sheerness. A pupil of Rossini in Italy, a singer on the London stage and organist at Rochester, New York. He travelled in U.S.A. and Canada (1833-41) teaching music and giving a series of recitals. Among his numerous popular songs are *Cher' Boys*, *Cher' A Life on the Ocean Wave*, *The Ty Ty Cry*, *O Woodman Spare that Tree*, *There's a Good Time Coming*. Sir London Ronald (q.v.) (really London Ronald R.) was his son.

Russell, Henry Norris (b. 1877) Amer. astronomer, b. at Oyster Bay, New York. He was educated at Princeton, New Jersey and later studied under Ball at Cambridge. R succeeded Young as director of Princeton Observatory in 1908. In 1913 independently of Hertzsprung he showed that the stars fall into two well defined classes, giants and dwarfs and outlined a new theory of stellar evolution. He devoted a considerable amount of time to the problem of the evolution of the solar system, the physical conditions of the planets and the composition of planetary atmospheres and in 1933 disproved Jeans's tidal theory of the origin of the solar system. Amongst his chief works may be noticed the following: *The Solar System and its Origin* (1935), *The Atmospheres of the Planets* (1935), *Present State of the Theory of Stellar Evolution* (1942) and (in collaboration with Dugim and Stewart) *A Revision of Young's Manual of Astronomy* (3 vols. 1926-27, 1945).

Russell, John (1711-1806) Eng. painter, b. at Guildford. He became A.R.A. in 1772 and R.A. in 1785. In 1785 R was appointed king's painter. He worked mainly in pastel and a number of his portraits hung in the National Portrait Gallery.

Russell, Lord John, first Earl Russell (1792-1878) Brit. statesman, b. in London the third son of John R. sixth duke of Bedford and educated privately, at Westminster and at Edinburgh Univ. He entered Parliament in the Whig interest and was an ardent supporter of reform. He first pressed for parli. reform in 1819 and supported the repeal of the Test Acts and Rom. Catholic emancipation. He became privy-seal and general of the forces in 1831 and led the House of Commons during Melbourne's short-lived administration three years later. When Melbourne again came into power in 1835 he was home secretary, but in 1839 went to the Colonial Office. He led the opposition against Peel and when Peel retired in 1846 he formed an administration. At the instance of Queen Victoria he insisted on the resignation of the foreign secretary, Palmerston who had without authorisation recognised Napoleon III as emperor of the Fr. after the *coup d'état* (1851). In 1852 he was defeated and resigned but accepted a seat in Aberdeen's Cabinet. He was for a short time colonial secretary under Palmerston in 1855, but in 1859 went to the foreign Office under the same leader. He was created Earl R. in 1861 and four years later on the death of Palmerston, again

became Prime Minister, with Gladstone as leader of the House of Commons but held office for only a few months resigning when his reform bill failed. Literature as well as politics interested R., and among his works are *A Life of Lord William Russell* (1819) an *Essay on the English Constitution* (1821) and *Causes of the French Revolution* (1832). R. came of a family all the members of which were versed in political matters and familiar with official and ministerial work. He was a good, but not inspired speaker, but at times he rose to a high level of eloquence. R. in fact anticipated to some of the policy usually associated with Palmerston which made Britain appear frequently in the role of the champion of continental liberalism. He had however less common sense than Palmerston and his policy frequently rested on the most delicate foundations. His greatest characteristic was self-conviction which nothing however untoward could undermine. He had an invincible belief in the advantages of an aristocracy, but at the same time was usually to be found in the van of the reform party. See lives by Sir S. Walpole, 1899 and A. W. Lilby, 1930.

Russell, John Scott (1838-87) Scottish civil engineer and naval architect. *b.* at Parkside near Glasgow. He studied at Edinburgh, St. Andrews and Glasgow Univ. and in 1852 became prof. of natural philosophy at Edinburgh. He began his famous series of observations on waves (1838) experimenting to ascertain the form of ships that will encounter the least resistance and to test the possibility of utilising steam navigation on the Edinburgh and Glasgow canal. He built the *Great Eastern* and other ships. R. was one of the organisers of the 1901 Exhibition.

Russell, Mary Annette, Countess, see ARNIM, MARY ANNETTE, COUNTESS VON

Russell of Killowen, Sir Charles Russell, Lord (1852-1900) Brit. lawyer and lord chief justice of England. *b.* at Newry of Roman Catholic parents. He was educated at private schools and at St. Vincent's College, Castleknock, he was articled in 1872 and admitted a solicitor in 1874 and practised in the counties of Down and Antrim. In 1876 he removed to London and entered at Lincoln's Inn. He was called to the Bar in 1879 and was Q.C. in 1872. He sat in Parliament as member for Dundalk (1880-83) and for S. Hackney in 1885-86 and in 1892 and was attorney general in 1886 and 1892. A strong Home Ruler, he was leading counsel for Parnell before the commission was one of the Brit. representatives in the Behring Sea arbitration, made lord of appeal and given a life peerage in 1891, and made lord chief justice the same year. He introduced the Secret Commissions Bill in 1900. R. was one of the greatest of nineteenth century Brit. judges. Few have been able to equal the brilliant lucidity of his summings up and as counsel, his skill in cross examination was outstanding. In a private capacity R. played a large part in the Eng. Catholic revival.

Russell, Sir Walter Westley (b. 1867), painter studied at the Westminster School of Art. He was elected A.R.A. in 1920 and R.A. in 1926. He became keeper of the Royal Academy in 1927 and 1938 trustee of the Tate Gallery, where his paintings are well represented.

Russell, Lord William (1639-83), Eng. politician third son of Wm. R., fifth earl and first duke of Bedford. R. studied at Cambridge. He represented Bedford in four Parliaments and was highly esteemed for his independence, being regarded as one of the heads of the Whig party. Becoming entangled with the Rye House conspirator, he was on very little evidence found guilty of high treason and beheaded in Lincoln's Inn fields. The Whigs regarded him as a martyr for religious and civil liberty, his real character is not well known but it seems probable that his actions were prompted, to a large extent, by personal ambition. See life by Lord John Russell, 1833.

Russell, Sir William Howard (1820-1907) Brit. war correspondent. *b.* at Lally Veleo Dublin and educated at Trinity College, Dublin. He was employed on *The Times* from 1841 and, though he was called to the Bar nine years later, he did not practise but continued to devote himself to journalism. He went to the Crimea during the war of 1854-55, and it was his letters to *The Times* on the condition of the Brit. Army that roused the public at home to recalculation of the shortcomings of the War Office and indirectly were responsible for the overthrow of the Aberdeen ministry. He was in India during the mutiny and in 1861 was in America during the early part of the war between the N. and the S. U. He was on duty also during the war between Germany and Austria and the Franco-Prussian war. He was the first as well as one of the greatest of war correspondents. Many of his contributions to *The Times* were reprinted in book form. See life by J. B. Atkins, 1911.

Russelia, small genus of stove evergreens, family Scrophulariaceae, of which the best known is *Tonina*, a hybrid with pendulous scarlet tubular flowers.

Russia, or the Union of Soviet Socialist Republics, federal state in Europe and Asia formed on the basis of a union of Soviet Socialist Republics comprising the Russian Soviet Federative Socialist Republic (R.S.F.S.R.) and fifteen others. It covers over one sixth of the earth's land surface. Its area in 1916 was given as 8,708,000 sq. m. and its total pop. is approximately 193,200,000. R. is bounded to the S. by the Black Sea, Afghanistan, China, Persia, Turkey and Mongolia; on the W. by Norway, Finland, the Baltic, Poland, Czechoslovakia, Rumania and Hungary; on the E. by the sea of Okhotsk (part of the Pacific Ocean) and on the N. by the Arctic Ocean. The Bering Straits (35 m. in width) separate R. from Alaska (U.S.A.). In the N.E. the S. R. reaches a lat. of 35° N., while its northernmost point is well within the Arctic Circle, reaching as far as 77° N. It extends roughly from long. 25° E. to 169° W.

Its immense size can be judged by such comparisons as the distances W to I between Minsk and Vladivostok (6000 m, a railway journey of at least ten days) and S to N from the Afghanistan border to Murmansk (1000 m, a railway journey of seven days). The Russian Empire which existed until 1917 had an area of about 8,500,000 sq m. In the period between the revolution and 1920 Poland, Finland, Lithuania, Latvia and Estonia established independent republics and the area of R was reduced to 8,173,500 sq m (1939). Between 1939 and 1945 however, R regained much of this territory and also acquired other territory in Europe some of which had earlier been ceded to Rumania and some which had formed part of pre 1938 Czechoslovakia. These cessions when added to acquisitions in Asia which had been gained between 1917 and 1946 made the total area in 1946 slightly larger than that of the old Russian Empire.

GEOGRAPHY—The basic geographical factor influencing all R's history is the great Russian plain. Within this framework P falls naturally into six divisions, the chief of which are the E. European Plain, S.W. R, the Lake Region, the Crimea, the Caucasus, the Caspian Basin, the Steppes, the Siberian Plain and the Pacific Slope. The main physical features of these divisions are as follows.

East European Plain—This slightly elevated plain reaches its greatest height in the Valdai Hills (1500 ft.) but has on the whole an elevation of less than 100 ft. On the N.W. it is bounded by two lakes and on the W. by Poland. It extends to the Ural Mts. whilst on the N.E. it has no natural boundary, but merges itself in the great Siberian Plain which stretches out to the E.

South-west Russia—This is the country between the Rumanian frontier on the W. and the R. Empire on the E. It is a low lying country. On the S. it extends to the Black Sea.

The Lake Region—This region lies in the N. of R. and includes the Leningrad and Novgorod areas. There are six lakes in the district the Novgorod area alone containing more than 3000. The lakes are usually joined one to another and the land is naturally low lying. However in some places a height of nearly 3000 ft. is attained. The chief of all the lakes is Ladoga. This lake is the fifth in size of all in R. and the largest in Europe in R. The greatest depth is about 300 ft. and the volume of its water is about nineteen times that of Lake Geneva. The temperature is low and for a third of the year the surface is frozen. The lake abounds with fish and has a peculiar species of seal. The R. Neva flows from it into the gulf of Finland. Lake Onega is joined up to the White Sea by means of a series of lakes and streams. The R. Swir flows out of it to the Ladoga. Onega is much deeper than Ladoga, the greatest depth being well over 700 ft. Lake Ilmen is formed by the meeting of a number of rivers in a shallow depression, the average depth does not exceed 30 ft. Lake Peipus (or

Chudskoye Lake) the S. part of which is called the lake of Pskov, divides the R.S.F.S.R. from the Estonian S.S.R. It connects with the gulfs of Riga and Finland. This lake also is very shallow, nowhere exceeding 90 ft.

The Crimea—The geological structure of this peninsula places it entirely outside R. proper. The climate is Mediterranean in type and the S. slopes of the Yaila Mts. are extremely fertile. The range culminates in an elevation of about 5500 ft. The rivers are few and short, the most important of them being the Sigeir. The whole peninsula may be regarded as a prolongation of the N.W. of the Caucasus.

The Caucasus—This is a mountain chain 750 m long running N.W. to S.E. from the Black Sea to the Caspian. The range finds continuation on the E. side of the Caspian. The chain is divided into two divisions by the Dural Defile through which a great military road runs. Towards the E. the range has a width of 100 m, whilst to the W. of the defile the breadth is about 120 m. At the defile itself it does not exceed 60 m. The highest peaks are found in the W. division where there are five which are higher than Mt. Blanc. The highest peaks of the W. Caucasus are Elbrus and Koshtantun.

The Caspian Basin—This area consists of level plainland interspersed with salt lakes extending E. into Kazakhstan. It was the bed of the formerly caldred Caspian Sea.

The Steppes—The broad belt of plainland extends in a S.E. direction from S.W. R. into Asia. It has S. of the deciduous forest area and verges on the desert in the E. The S.E. steppes are drier and more barren than the European steppes but all have a wide range of fruits.

The Siberian Plain—This section of the Russian plain is divided from the E. European plain by the Ural Mts. It is low lying and level in the W. rising in the E. to plateau.

The Pacific Slope—From the mountain ranges which rise from the Siberian plateau in the land slopes to the sea of Okhotsk and the sea of Japan both projections of the Pacific Ocean.

Seaboard and Islands—There is excellent fishing in the Arctic Seas but the ports are of little importance since for nearly three quarters of the year the outlets are frozen. The White Sea with its inlets Onega and Dvina and its port Archangel has regained much of its importance which it formerly possessed. During the Second World War it became extremely important being a harbour accessible to British and American convoys. Other inlets such as Ichesskaya and Ichchora are surrounded by waste frozen land and the Kara Sea is only open to navigation for a few weeks in the year. Of the 14 of the N. most are uninhabited. The Bering Sea and the coasts which border on the sea of Japan lose much of their value owing to the fact that they are bleak and inhospitable. The great gulf which has the town of Vladivostok as its

head is separated by miles of waste land from the interior and the value of one of the most magnificent harbours in the world suffers much from this fact. R has a Baltic seaboard and the Baltic Soviet Socialist Republic (S.S.R.) possesses a number of good harbours, Leningrad is the port of the gulf of Finland. The Black Sea has gained in importance since the revolution. The coast lands are being developed and as the produce of the interior becomes greater so the importance of the Black Sea increases. The sea of Azov is the greatest inlet of this sea but the importance of the Black Sea is diminished by the fact that it has so few good ports. The Soviet Gov. has enlarged and modernised such ports as exist and has brought forward projects for the creation of new artificial harbours. Odessa is the second port of R and the greatest commercial port of the Black Sea. Sevastopol is the great naval station and Batumi owes its importance to the fact that it is the port of the oil fields of the Caucasus but owing to the Soviet restrictions on imports and exports its trade has declined. The great inland sea of R the Caspian forms a good means of communication from the Transcaucasian ports to central Asia and also between central Asia and Persia. Canals connecting with the Volga have established communications between the Caspian, Black, Baltic and White Seas. It is of great importance as a fishing centre and supplies almost the whole of R with fish. It is particularly noted for its salmon and sturgeon.

Orography. The main feature in the physical structure of P in Europe is the vast low lying plateau which sweeps from the Urals to the plains of middle Europe and which seldom rises 800 ft. above sea level. It stretches from the N.E. to the S.W. To the N. and W. of it stretches a long strip of lowland whilst the S. and W. of it are bounded by low lying plains. The N.W. border of this plateau which includes the Valdai Hills and the plateau of Minsk is the highest part of it. In central R the plateau once again reaches this height on the banks of the Volga. The whole area is further marked by a series of deep depressions which follow the lines of the R., Dnieper, Don, and part of the Volga, and there are traces of deeper depression of preglacial times. The Ural Mts. cannot be considered as a mountain chain. In the S. they consist of a series of parallel ridges which continue into the mts. of Fennoscandia and Lapland. Continuing N. they appear to be only a continuation of the central plateau whilst in the extreme N. they are simply low lying hills. Asian R. N.E. of the Ural rises to form a central mass of mts. and high plateaus. The Pamir Mts. include the Stalin peak (24,598 ft.) and the Lenin peak (23,390 ft.). Mts. of the Central Siberian plateau include the Yenisei heights (3,500 ft.), the outer highlands of the Sayan system (6,000 ft.) between the upper Yenisei and Angara Rs., the highlands on both sides of the upper Lena (1,000-4,000 ft.), the mt. and plateau region N. of Lake Baikal (1,000-6,000 ft.) and the Fungus Mts.

(rising to 3,500 ft.). The Sayanid system of highlands extends from the upper Darya basin in the W. to the watershed between the Aldan R. and the Zeya R. in the E. and separates R. from Mongolia. The Cherski range discovered in 1926 is the central range of a system of mts. running parallel to the Verkhoyansk Kolyma Anadyr system. Two parallel ranges run in a N.W. direction through Kamchatka. On the E. side of the ranges overlooking the Bering Sea are sev. volcanoes including Klichhevski (nearly 16,000 ft.).

Rivers.—The whole development of R. has depended to a very great extent upon her rivers and her watersheds. When it is realised that it is possible to take a boat from the extreme N. of R. and after carrying it across a low lying watershed launch it in another riv. that will bear it southward it can be seen that such an arrangement of rivers is of great importance. The chief rivers of Europe in R. have their source within comparatively few miles of one another to the N.W. of the central plateau. Some of them curve round the plateau flow S. and find their outlet in the S. e.g. the Dnieper the Volga and the Don. Others flow in a N.W. direction e.g. the Dvina the Onega and the N. Dvina. The rivers of Asian R. are important for their value as means of communication, the most important are the Ob and its tribs, the Yenisei and the Lena. R. in S. is described as a country of rivers and canals and the dependence which is placed upon these rivers and canals is of overwhelming importance. For example the Volga is connected with the Lika, Onega and Ladoga and has thus become a means of transit from W. to E. The Volga is also connected with the N. Dvina which enters the White Sea and with the Caspian and the Dnieper is connected by canal with the Dvina, the Niemen and the Vistula. The water discharge of the river is however comparatively small and during the winter navigation of the river generally ceases. See further under the names of the rivers.

Climate.—The climate of Europe in R. is most easily described as continental. This is true of all save the Crimea and some small portions of the coast of the Black Sea. R. therefore in the whole gets an extremely hard and long winter followed by a cool pleasant spring, an excessively hot summer and a very cold autumn. The rainfall is on the average small and the rains take place chiefly during the summer and the autumn. The winter is hard and very cold everywhere. In the S. as late as May 6, the temp. is often only 30° F. and further N. often below 10°. Nearly every riv. in R. is frozen for at least a quarter of the year and in the N. for considerably more than a third. In summer however the temp. is correspondingly high rising as far N. as Archangel to a mean temp. of well over 70° for July. The mean rainfall differs from about 15 in. in the E. to about 24 and sometimes 37 in. in the W. In the winter time the country suffers greatly from blizzards. In Asian R., W. Siberia

has an extremely cold winter and a hot summer. In Siberia is even drier and colder; the pole of cold around Verkhoyansk is the coldest place in the L hemisphere. The climate in Kamchatka is milder and wetter. Central Asian R is dry and has cold winters while the Caspian Basin is an arid region with extremely hot summers.

Flora—In the vast stretch of ter from E to W in R are tundras, steppes and forests. The last have been extensively developed especially in the W and S. Great clearings have been made in the forest lands of the W and corn and wheat are grown to a very large extent. The region which touches the shores of the Black Sea and the rest of the S of R produce much the same products as the rest of S Europe. Here is found the vine and maize is also very extensively cultivated. Tea is grown S of the Caucasus Mts and cotton is also cultivated chiefly in the extreme S. In the N of Asiatic R vegetation is scanty but the rich steppe land of the Amur region has a vegetation like that of both the desert and the E coast woodlands so that both deciduous forests and evergreen areas are found.

Fauna—In the Arctic regions the polar bear, Arctic fox, seal and reindeer are found and the waters of those regions abound with salmon, trout and cod. In the extensive forest are found the stag, fox, bear and wolf. The lynx and elk, which were originally found in great numbers in these regions, are gradually being exterminated. Cattle, sheep and horses are found on the grasslands which still cover much of R. In the forest region many varieties of birds are found the principal of which are the grouse and the partridge. Many of these animals are found also in the steppes of R but this district abounds principally in hares and foxes together with the sika, a great cause of destruction to the corn lands. The fish of the district include the sturgeon and the sterlet of the Volga together with the carp and squal. The fauna of Siberia is similar to that of European R save that fur

bearing animals are found in far greater quantities. The tiger is occasionally met with in the districts of the S and E, and in the Pamir dist the most characteristic animal which abounds is the *Ovis poli* or the great mt sheep.

Races—It is inhabited by the descendants of many races. It is estimated that various branches of Slavs form at least 50 per cent of the total pop. These include the Russians themselves who number rather over half of the pop of R. About 200 different languages are spoken in R. The main racial groups apart from the Russians are the Ukrainians (making up about 20 per cent of the total pop.) White Russians, Poles, Lithuanians, Letts, Estonians, Moldavians, Georgians, Armenians, Latins, Ossetians, Turcomans, Turks, Tajiks, Kirghizians, Bashkirs, Kalmyks, Buriats, Kalmuks, Uzbek, Ossetians, Jews, Mordvians, Chuvash and Chechens. Apart from the Ukrainians all these national groups are comparatively small. Before the revolution of 1917 they were not recognised as national groups at all and Russian was rigidly maintained as the official language. Since the revolution these nationalities have been allowed the official use of their own language and have been encouraged to develop their own cultures to varying extents. The federal character of the state emphasises the equality granted to all nationalities within it by the Bolsheviks in 1917. Within the constituent republics there are autonomous regions and republics created for smaller national groups. The area of S.W. Asia in R has been much developed by the Soviet Gov. In the 19s the different nationalities have wide powers of self government. In fact, however, Russian domination is complete and Russian dominance has continued.

AREA AND POPULATION The R S S R (1926) extends for three quarters of its ter into Asia. It occupies about 75 per cent of the ter of the U S S R and contains over half the total pop. The area and pop of the R S S R and the fifteen S S R's are estimated as follows:

Republic	Area in Square Miles	Population	Capital
I R S S R	6,444,000	109,000,000	Moscow
II UKRAINIAN S S R	223,000	40,000,000	Kiev
III WHITE RUSSIAN (BYELO RUSSIAN) S S R	41,000	10,365,000	Minsk
IV AZERBAIJAN S S R	3,000	3,210,000	Baku
V GEORGIAN S S R	37,000	3,442,000	Tiflis
VI ARMENIAN S S R	11,000	1,300,000	Yerevan
VII TURKIC S S R	181,100	1,231,000	Ashkhabad (Politaratsk)
VIII UZBEK S S R	1,117,000	6,282,000	Tashkent
IX TAJIK S S R	5,000	1,481,000	Stalinabad
X KAZAKH S S R	1,001,000	6,146,000	Alma Ata
XI KIRGHIZ S S R	78,000	1,500,000	Runzo
XII KARLO-BYKOVSK S S R	76,000	900,000	Petrozavodsk
XIII MOLDAVIAN S S R	13,200	2,200,000	Kishinev
XIV LITHUANIAN S S R	31,000	2,879,100	Vilna
XV LATVIAN S S R	24,840	1,950,000	Riga
XVI ESTONIAN S S R	18,600	1,150,000	Tallinn

The S S Rs are in some cases subdivided into P'ss (P's), Regions (R's), Autonomous Regions (A R's) and Autonomous Soviet Socialist Republics (A S S R's)

<i>Administrative Divisions</i>	<i>Chief Town</i>
I RUSSIAN SOVIET FEDERATIVE SOCIALIST REPUBLIC	Moscow
1 Altai R	Barnaul
2 Krasnodar R	Krasnodar
3 Krasnovarsk R	Krasnovarsk
4 Primorye R	Vladivostok
5 Stavropol R	Voroshilovsk (formerly Stavropol)
6 Khabarovsk R	Khabarovsk
7 Aichungel R	Aichungel
8 Astikhan R	Astikhan
9 Bryansk R	Bryansk
10 Chikitsy Tuki R	Chikitsy Tuki
11 Vladimir R	Vladimir
12 Vologda R	Vologda
13 Voronezh R	Voronezh
14 Gorky R	Gorky
15 Grozny R	Grozny
16 Ivanovo R	Ivanovo
17 Irkutsk R	Irkutsk
18 Kaliningrad R	Kaliningrad (formerly Königsberg)
19 Kalinin R	Kalinin (formerly Tver)
20 Kamishchev R	Kamishchev
21 Kazan R	Kazan
22 Kiziluzh R	Kiziluzh
23 Kemerovo R	Kemerovo
24 Kirov R	Kirov
25 Kostroma R	Kostroma
26 Kuznetsk R	Stavropol
27 Kursk R	Kursk
28 Leningrad R	Leningrad
29 Molotov R	Molotov (formerly Gorky)
30 Moscow R	Moscow
31 Murmansk R	Murmansk
32 Novgorod R	Novgorod
33 Novosibirsk R	Novosibirsk
34 Omsk R	Omsk
35 Orsk R	Orsk
36 Penza R	Penza
37 Pskov R	Pskov
38 Rostov R	Rostov
39 Riazan R	Riazan
40 Saratov R	Saratov
41 Sakhalin R	Alexandrovsk
42 Sverdlovsk R	Sverdlovsk
43 Smolensk R	Smolensk
44 Stalingrad R	Stalingrad
45 Tambov R	Tambov
46 Tomsk R	Tomsk
47 Tula R	Tula
48 Tyumen R	Tyumen
49 Ulyanovsk R	Ulyanovsk
50 Chelyabinsk R	Chelyabinsk
51 Chita R	Chita
52 Chkalov R	Chkalov (formerly Gribnitsky)
53 Yaroslavl R	Yaroslavl
54 Tatar A S S R	Kazan
55 Bashkirian A S S R	Ufa
56 Dagestan A S S R	Nakhach-Kala
57 Buryat-Mongolian A S S R	Ulan Ude

Administrative Divisions

Chief Town

58 Kabardinian A S S R	Nalchik
59 Komi A S S R	Sykt'ykar
60 Mari (Chechenist) A S S R	Yoshkav Ola
61 Mordvinian A S S R	Saransk
62 North Ossetian A S S R	Ordzhonikidze
63 Udmurt A S S P	Ishchevsk
64 Chuvash A S S R	Cheboksary
65 Yakut A S S R	Yakutsk
66 Adyghe A R	Novorossiysk
67 Jewish A R	Abkhaz
68 Orsk A R	Orsk
69 Jewish A P	Kysylcheto
70 Khanty A R	Abkhaz
71 Cherk A R	Sulimov
II UKRAINIAN SOVIET SOCIALIST REPUBLIC	Kiev
1 Vinnytsya R	Vinnitsa
2 Vilynytsya R	Vinnitsa
3 Voroshilovgrad R	Voroshilovgrad
4 Dniepropetrovsk R	Dniepropetrovsk
5 Drobovych R	Drobovych (formerly Drobovych)
6 Zhitomir R	Zhitomir
7 Transcarpathian R	Uzhhorod
8 Zaporozh R	Zaporozh
9 Izmail R	Izmail
10 Kamnits R	Kamnits
11 Podolsk R	Kamnits
12 Kiev R	Kiev
13 Kirovograd R	Kirovograd
14 Ivov P	Ivov
15 Nikoliv R	Nikoliv
16 Odessa R	Odessa
17 Poltava R	Poltava
18 Rovno R	Rovno
19 Stalino R	Stalino
20 Stalinsk R	Stalinsk
21 Sumy R	Sumy
22 Ternopol R	Ternopol
23 Kharkov R	Kharkov
24 Kherson R	Kherson
25 Chernigov R	Chernigov
26 Chernovits R	Chernovits (formerly Czernowitz or Cernauti)
III AZERBAIJAN SOVIET SOCIALIST REPUBLIC	Baku
1 Nakhichevan A S S R	Nakhichevan
2 Nagorno-Karabakh A R	Stepanakert
IV GEORGIAN SOVIET SOCIALIST REPUBLIC	Tiflis
1 Abkhazian A S S R	Sukhumi
2 Adjara A S S R	Batum
3 South Ossetian A R	Stalin

<i>Administrative Divisions</i>	<i>Chief Town</i>
V UZBEK SOVIET SOCIALIST REPUBLIC	<i>Tashkent</i>
1 Andizhan R	Andizhan
2 Bokhara R	Bokhara
3 Kashka Darya R	Karsh
4 Namangan R	Namangan
5 Samarkand R	Samarkand
6 Surkhan Darya R	Termiz
7 Ferghana R	Ferghana
8 Khorezm (Khiva) R	Khorezm (Khiva)
9 Kara Kalpak ASSR	Turtkul

VI KAZAKH SOVIET SOCIALIST REPUBLIC	<i>Alma Ata</i>
1 Akmolinsk R	Akmolinsk
2 Akt'yubinsk R	Akt'yubinsk
3 Alma Ata R	Alma Ata
4 East Kazakhstan R	Kokpekt'y
5 Gur'yev R	Gur'yev
6 Jambul P	Jambul
7 West Kazakhstan R	Uralsk
8 Karaganda R	Karaganda
9 Kzyl Orda R	Kzyl Orda
10 Kokchetov R	Kokchetov
11 Kustanai R	Kustanai
12 Pavlodar R	Pavlodar
13 North Kazakhstan R	Petrovavlovsk
14 Semipalatinsk R	Semipalatinsk
15 Taldy Kurgan R	Taldy Kurgan
16 South Kazakhstan R	Chimkent

VII TAJIK SOVIET SOCIALIST REPUBLIC	<i>Stalinabad</i>
1 Garm R	Garm
2 Kulvab R	Kulvab
3 Leninabad R	Leninabad
4 Stalinabad R	Stalinabad
5 Gorno-Badakhshan A R	Khorog

VIII WHITE RUSSIAN SOVIET SOCIALIST REPUBLIC	<i>Minsk</i>
1 Baranovich R	Baranovich (Baranovitch)
2 Bobruisk R	Bobruisk
3 Brest L	Brest Litavsk
4 Vitebsk R	Vitebsk
5 Gomel R	Gomel
6 Grodno R	Grodno
7 Minsk R	Minsk
8 Mogilev R	Mogilev
9 Molodechno R	Molodechno
10 Pinsk R	Pinsk
11 Polesye R	Polesye
12 Polotsk R	Polotsk

<i>Administrative Divisions</i>	<i>Chief Town</i>
IX TURKMIN SOVIET SOCIALIST REPUBLIC	<i>Ashkhabad (Pollarat'sk)</i>
1 Ashkhabad R	Ashkhabad (Pollarat'sk)
2 Merv (Mary) R	Merv
3 Tashaur R	Tashaur
4 Chardzhon R	Chardzhon
X KIRGHIZ SOVIET SOCIALIST REPUBLIC	<i>Frunze</i>
1 Dzhalal Abad R	Dzhalal Abad
2 Issik kul R	Karakol (Przhnevsk)
3 Osh R	Osh
4 Talas R	Dmitrievsk
5 Lenin-Shan R	Fulcha
6 Frunze R	Frunze

XI XVI The Armenian Karelsk and 1st divisions have no administrative subdivisions such as the above

Chief Towns—Incs in R with an estimated pop in 1939 of over 100,000 were: Moscow (413,000), Leningrad (319,300), Kiev (216,300), Kharkov (233,400), Baku (509,300), Rostov (141,100), Odessa (604,200), Tashkent (30,000), Irfis (19,200), Rostov-on-Don (10,300), Dnepropetrovsk (100,700), Stalin (462,000), Stalingrad (14,500), Sverdlovsk (4,000), Kazan (10,000), Kuibishev (390,000), Saratov (376,000), Voronezh (327,000), Yuzovsk (298,000), Zaporozh (259,000), Ivanovo (25,000), Archangel (281,000), Omsk (81,000), Chelyabinsk (273,100), Lul' (2,000), Melotov (2,200), Astrakhan (24,000), Ufa (24,900), Irkutsk (213,000), Makhovka (240,100), Minsk (231,000), Alma Ata (230,500), Murnavsk (222,000), Kalinin (210,000), Voroshilovgrad (213,000), Vladivostok (206,000), Krasnodar (203,900), Frivan (200,000), Khabarovsk (199,400), Kirovograd (197,600), Krasnovarsk (190,000), Taganrog (188,800), Izhevsk (175,700), Chiklov (172,900), Grozny (172,000), Stalin (169,000), Vitebsk (167,400), Niko (167,100), Karaganda (165,900), Nizhni (141,100), Leningrad (147,100), Smolensk (140,000), Shakhty (1,000), Barnaul (148,100), Dneprodzerninsk (147,800), Magnitogorsk (14,900), Gomel (144,200), Kirov (143,000), Smolensk (142,700), Gorki (141,200), Pribinsk (139,000), Samarkand (134,300), Kemerovo (133,000), Politava (10,300), Leningrad (129,400), Ordzhonikidze (127,200), Ashkhabad (Pollarat'sk) (126,600), Lumbay (121,300), Kostroma (120,200), Kursk (120,000), Murmansk (117,000), Sevastopol (112,000), Orel (110,600), Semipalatinsk (109,800), Gorlovka (108,700), Irokovpysk (107,200), Kerch (104,500), Dzerzhinsk (103,400), Chita (102,600), Ulyanovsk (102,100), Kirovograd (100,300).

THE SOVIET ECONOMIC SYSTEM—The economic system of R is based on the Socialist system of economy and the Socialist ownership of the instruments and means of production. All the chief industries and large factories, shipping, airlines, docks and warehouses and banks are controlled by salaried managers appointed by and responsible to, the particular ministry or gov. dept. which administers the industry in question. The heavy industries are under the control of Union ministries. Individuals therefore cannot derive income in the form of profit interest dividend or rent (except interest on a savings bank account or state savings loan) and the *rentier* class has ceased to exist. The only way people can earn money in R is in work for wages or salary (e.g. authors may receive royalties based on the size of the book and artists may sell their pictures). But there are also a certain number of workers in small self-governing 'producers' co-operatives (*artels*) which are generally engaged in making artistic or specialty products unsuited to mass production methods in large factories. Thus there are co-operative fishermen's groups owning their own boats or trawlers and working for themselves on the coast and inland waters, but deep-sea fishing is in the hands of the larger state-owned trawler fleets. Sometimes these co-operative workers work in their own homes merely selling their products and getting their materials through their co-operative society, but mostly they work together in jointly owned workshops, sharing the proceeds or co-operative dividend of the sale of their joint products. However, only the agrico-producer co-operatives (i.e. the collective farms) are of major economic importance. In 1937 they owned 20.3 per cent of the total means of production in agriculture. In these farms sharing is on the basis of the 'labour days' contributed by each person to the work, more responsible or skilled work being valued more highly in terms of 'labour days' than less responsible or less skilled work. Both farm products and cash proceeds are shared. Prior to the first five-year plan farming was still mostly done by individual owner-worker peasants, there being relatively few collective farms in the first decade of the Soviet regime, but under the five-year plan the number of collective farms increased enormously and today the farms of the old order of individual peasants (or *kulaks* (q.v.)) now occupy no more than 1 per cent of the cultivated land of R. Collective farms manage their own affairs through elected committees, but they are obliged to deliver an annual quota of specified kinds of produce to the state buying organisations at prices well below the ordinary market price, the difference in effect representing rates and taxes. These deliveries go to provide supplies for towns and factories but the surplus may be sold for as much as the farm can get. Not all their working time is spent by members in the collective farm. Each member may have allotted to him a small 'farmstead' or allotment

up to 2 ac. and much of his time is passed in its cultivation. In the collective farm village each family has its own house and garden and 'farmstead'. The collective farm itself may have not only central offices and barns but also a kindergarten and a school club, and cinema. At harvest time the farm may have ploughing or harvesting implements from machine tractor stations which are state-owned stations for lending out machinery in exchange for a fixed share of the harvest crop. Besides collective farms there are



Soviet Wells

WHEAT HARVEST AT THE STALIN COLLECTIVE FARM IN THE STAVROPOL REGION OF THE RSFSR

11. Grain of the new harvest is being prepared for delivery to the state.

a certain number of state farms, generally larger than collective farms, under the management of these farms appointed by the commissariat responsible for them. There is a more specialised type of farming, thus there are a number of state live-stock farms, and cotton-sugar beet and dairy farms, and on the Black Sea coast notably at Yalta there are state wine farms. Their chief function is that of research, experiment and development.

State farming and industry do not come into existence or function in any haphazard manner. Industry is regulated according to an economic plan and worked out for the whole country, and managers are appointed to effectuate this master-plan. Their duty is to run the factory or industry with the maximum efficiency so

as to produce as much as possible with the minimum waste of raw material, wear and tear of machinery, or time. The plan is a vast programme or series of programmes, of production, setting out what the various industries and factories and farms shall turn out in the year and setting out the appropriate amounts of raw material to be allotted. The body that prepares this plan is called the State Planning Commission, or briefly, 'Gosplan,' a body of economists and engineers who advise the gov in all planning matters with branches in the various republics or dists and also in the groups of factories in each industry. After full discussion with the industry and all others concerned the draft plans and amendments and criticisms are referred back to Gosplan which then co-ordinates all the separate plans and meets (central criticisms and it was in this way that the famous five-year plans were prepared. Within each five year plan there were fuller and more detailed annual and quarterly plans which filled out the general framework of the long-term plan (see further under HISTORY). The commissariats (ministries) are responsible for the implementation of the plans, either for a branch of activity throughout the whole Union or indirectly through the respective ministries of the constituent republics. The complete field of Russian life is covered by these ministries and their counterparts in the republics. The head of an industry or factory is responsible for what happens in the industry or factory and he must see that the workers obey his orders. The trade unions which are essentially state concerns have a voice in the appointment of managers in the sense that they are consulted before the appointment is actually made and the workers through their trade union may criticise a manager. Membership of trade unions is voluntary but most workers in view of the privileges of unions are members. Wages are fixed in consultation between the gov planners and the trade unions. Workers' factory committees supervise working conditions and the general discipline of the works. Social insurance is a function of the trade unions.

The leaders of the Soviet Gov were soon compelled to abandon the undiluted Communist idea of distribution according to needs and to accept the principle of 'from each according to his ability to each according to his work'. The incentive of personal profit for additional effort seeps through the whole system. First there came the so-called 'shock worker' system, and later, the piece work system called the Stakhanovite movement after its proponent, Alexei Stakhanov, a Donbas coal miner, who worked out a better method of hewing coal and so increased the amount he was able to hew in one shift. The wages earned by this piece-rate system are considerably higher than the time rates.

Great economic strides in R are assured by the enormous wealth and the undeveloped resources of the country. In agriculture and mineral wealth it will be

independent of import (or export) for many years to come. There may be and often is enormous waste through bureaucracy, incapacity, or unadaptability but nevertheless the net gain will probably be great enough to enrich the state and through it, really enhance the still low living standards of the people.

Finance — State control of the financial system is an essential instrument for the planning of Russian economy. Article 14 of the constitution gives to the central gov the supervision of the monetary and credit system of the country, the administration of the banks, the organisation of state insurance (etc), and empowers it to sanction the state budget and the revenues and taxes comprising the republic and local budgets. A unique characteristic is that the Soviet budget includes the major part of the resources accumulated by Russian industries. These are regarded as the difference between cost price and wholesale selling price; the latter is fixed by the gov and to surmise the former the financial authorities exercise a degree of control over the processes of production. Of the accumulated funds of each industrial establishment one part is passed to the state by the turnover tax, and the other remains in the factory and constitutes its profit. This too belongs to the state, but is handed over only in part in accordance with a special procedure. The variation in turnover tax rates enables the accumulation of reserves in industry to be controlled and a definite price policy to be carried out. In the period 1938-40 the total income of the Soviet state budget was 4.0 thousand million roubles, of this the turnover tax accounted for 1.8 thousand millions and profits from economic enterprise for 1.8 thousand millions. Thus 75 per cent of R's budgetary revenue was derived from the economic activities of organisations within the Socialist system. Another characteristic is that the Russian national budget includes the budgets of the constituent republics and all local gov bodies and the financial resources of republics or dists are supplemented where necessary from the central exchequer to enable the requirements of the economic plan to be carried out. The table shows revenue and expenditure in 1940 for the U.S.S.R. and republics (including local) budgets in thousands of millions of roubles.

The present Russian banking and currency mechanism was founded at the end of 1921 with the estab. of the state bank of the U.S.S.R. with the right of issue. Subsequently the bank became the sole repository for currency reserves and the regulating institution of the whole currency system. In 1930 the credit system was reformed upon two lines all short term financing became the exclusive prerogative of the state bank and bills of exchange were abolished, no public business concern being permitted to give credits to another. For short term loans all business organisations thus became clients of the state bank, and the other banks were restricted to long term financing. State bank loans, made as an

analysis of the client's economic and financial position have thus become a very effective instrument for the government control of state enterprises, which are all expected to be self supporting or to make a profit. The bank's resources are chiefly derived from the resources of the country flowing into it as the sole bank of settlement further supplemented by budget assignments and by its own profit.

Revenue	Union Budget	Republican & Local Budgets	Total
Turnover tax	95.6	10.3	105.9
Contributions from profits	12.8	8.9	21.7
Income of machine and tractor stations	1.0	1.0	2.0
Taxes on the population	1.9	7.5	9.4
Local taxes		1.9	1.9
State loans	0.2	0.3	1.1
Income tax on co-operative organizations and non-commodity operations tax	0.2	3.0	3.2
Social insurance funds	6.6	2.0	8.6
Customs duties	2.1	—	2.9
Other revenues	5.7	1.1	13.1
Total	133.9	44.3	180.2

Expenditure	Union Budget	Republican & Local Budgets	Total
National economy	41.9	8.1	50.0
Welfare and cultural services	12.9	28.9	41.8
National Defence	0.5	—	0.5
Payment of National debt	0.8	—	0.8
Other expenditure	9.8	0.7	10.5
Total	132.2	43.0	175.2

Since foreign trade is a state activity the finance ministry is able to nominate a gold value for the external rouble and to maintain it without any variation against the dollar and the pound. The gold value bears no relation to the rouble purchasing power in the R.S.F.S.R. Gold backing for the rouble is unlimited. It is usually conducted through transactions abroad in foreign currency accounting being carried out by the state bank through its bank correspondents abroad. The exchange value of the rouble to the £ in May 1940 was 11.20.

Agriculture—Agriculture is controlled by the Ministry for Agriculture. The total area under cultivation, including individual owner peasant farms, collective farms, and state farms (see *The Soviet*

Economic System) was nearly 395,000,000 ac in 1941, before the German invasion. In the same year there were over 240,000 collective farms (a fourfold increase since 1930), 1,300,000 individual owners, 39,600 state farms, and 6,910 tractor stations. The black soil area of 51.2 R. (about 270,000,000 ac) is the chief grain producing land. Cereals are the chief product and then follow flax, hemp, potatoes, beetroot, and tobacco. In 1939-41 grain crops averaged 111,000,000 tons. It is famous for her cotton fields and cotton industry. The chief centres of cotton growing are the river valleys of central Asia in the Turkmen S.S.R. Under the five year plans prior to 1939 vast new irrigation schemes were undertaken to bring water along artificial channels to irrigate the desert and so open up new lands where cotton could be grown. About three times as much cotton is grown as under the tsars. Silk is more extensively cultivated than formerly, not only in central Asia and Transcaucasia but in new areas, namely the Ukraine, China, and in the areas around Voronezh, Stalingrad, and Kursk. Wild rubber plants are being cultivated in various parts of the Union. In the S.S.R. no fruit trees and the vine are cultivated. Agriculture is being steadily electrified. Before the Second World War 1 per cent of the collective farms and 25 to 30 per cent of the state farms had been electrified, many by means of hydro electric power.

The raising of cattle also occupies an exceedingly important place, especially in the neighbourhood of the grassy steppes; sheep are largely produced, also cattle, horses, camels, and pigs. The rivers, especially the Volga and the Siberian rivers, give much opportunity for fishing, whilst the top of the vast deserts of Siberia are killed for trappers.

Soviet agriculture suffered severely during the Second World War. In the German occupied areas the collective farm system broke down, and the scorched earth policy of the retreating Russians destroyed thousands of acres of crops. The five year plan of 1946-50 therefore laid stress on the rehabilitation of agriculture and set the target "Total farm produce in the U.S.S.R. as a whole shall be increased by the end of the five year period 27 per cent above the 1940 figure. Wheat, rice, and vegetables were to be especially increased. Collectivization was to be strengthened and the efficiency of machine and tractor stations increased. During the five year period the number of horses was to be increased 4 per cent, horned cattle 39 per cent, pigs 150 per cent, sheep and goats 1 per cent. Dairy farming and market gardening in the vicinity of the large cities was to be encouraged. Afforestation, artificial fertilisation, drainage, hedges, and vast irrigation projects were to help the progress. Agriculture was to be a priority industrial product, and in the unions and territorial institutions agricultural research was to be encouraged. It was claimed that the gross output of agriculture as a whole in 1949 exceeded that of 1940.

Forestry There are nearly 2 500 000 000 ac of forest land in R, covering over 44 per cent of its total area. R contains about one third of the world's lumber supply. It has been estimated that Asiatic R contains about 78 per cent of R's forestlands. Because of the shortage of roads these forests are difficult to exploit though since the revolution a number of new roads have been constructed making forest exploitation easier. The forests of European R lie mostly to the N, declining towards the central regions and the S, with the exception of the Caucasus where there are over 15 000 000 ac of forest land which supply many valuable kinds of timber. The state administers and works the larger part of Russian forest land but about 72 000 000 ac are allowed to the peasantry for free use. Lumber felling and wood working are the main industries in the frozen region of the Arctic Circle and to the S of it. This forest belt extends N from Leningrad through Karcha and E into Siberia where it stretches across the rivers which flow N into the Arctic Ocean. Much of the timber here is fir and pine. In W R timber and resin are exported in considerable quantities. The large paper industry of the RSFSR depends entirely on Russian timber.

Before the Second World War the Soviet Gov had pursued a policy of afforestation in certain mountain areas of R especially in the S, on a very limited scale but with marked success. The five year plan 1946-50 provided that 'the tree plantations laid out for the protection of collective and state farms fields in the steppe and wooded steppe regions shall be restored and new belts of rapidly growing trees (including fruit trees) and bushes (including berry bushes) planted; trees including fruit trees shall also be planted along rivers'. This clause was enlarged upon in a gov plan of Oct 1948 called the Stalin Plan (see Politburo illustration p 302). This ten to fifteen year plan provided for the planting of a series of forest belts totalling 3300 m which would form a defence against the drying winds which normally sweep across the European steppes from central Asia. The greatest belt was to be planted from the Caspian Sea to the Urals. It was estimated that this policy would protect nearly 90 000 collective farms (crop rotation with grasses and a scheme for building reservoirs and ponds in the steppes were an additional part of the scheme. In 1950 it was claimed that 370 000 hectares had been afforested in 1949 and that 500 000 hectares had been afforested since the inauguration of the 1946-50 five year plan.

Electrification.—Lenin was convinced, even before the Oct Revolution that large scale electrification would provide the only basic technique adequate to the establishment of a Socialist economy. He emphasised the need for a rational distribution of industry 'with special attention given to the electrification of industry and transport and the adaptation of electricity to the purposes of agriculture,' and

his tenacity enabled the many serious obstacles in the way of electrification to be overcome. A commission headed by G. M. Krzhizhanovskiy the scientist submitted a plan in Dec 1920 which covered the restoration and reconstruction of the whole national economy with electrification as the indispensable basis. This Godro plan depended in the main upon scientific exploitation of low grade fuels. The actual working out of the plan, including the restoration of pre-war electric power economy, the extension and reconstruction of existing stations and the construction of thirty new power stations with a total capacity of 1 000 000 kw was completed in the minimum time allowed, i.e. ten years. The total generating capacity of R increased nearly sevenfold and the total output of electricity more than seventyfold in the seventeen years between Dec 1920 the beginning of the Godro plan and Dec 1937 the end of the second five year plan. Under the 1946-50 plan the target for electric power was an installed capacity of 22 400 000 kw.

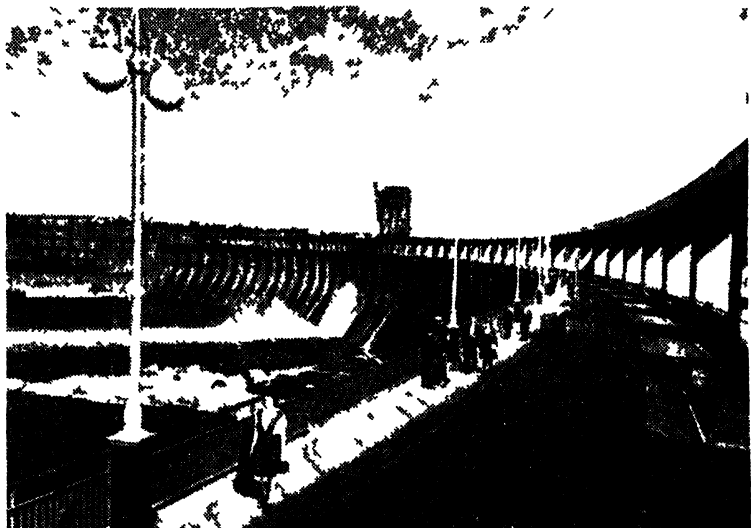
The largest hydro electric power station in pre-revolutionary R had a total capacity of 10 kw. The first Soviet hydro electric plant the Volkhov power station placed in service in 1926 had an installed capacity of 34 000 kw. By 1932 the first of a number of generating units each of about 62 000 kw was set to work at the Dnieper hydro electric power station. In 1933 this plant had a capacity of 60 000 kw and in 1941 was the largest hydro electric station in Europe and one of the largest in the world. In its vicinity a large new industrial centre was created to use a large part of the power generated. This centre in Ludes Greater Zaporozhe included a combination of enterprises producing aluminium and its oxides, electrodes, ferro-alloys, high quality tool steel and alloy steels. The reconstruction of transport in the Dnieper coal region was closely bound up with the Dnieper station which is the major source of power for the electrified railroads connecting the Dnieper basin with the Krivoi Rog and Dnieper area (all of which industrial area was overrun by the Gers in Aug 1941 and to a great extent laid waste by the Russians when they withdrew). The Dnieper station also provides a basis for the gradual electrification of agriculture, electricity having become an indispensable part of the daily life of the collective farms in that region. Finally, a long distance transmission system with 160 m of high tension lines has been completed between the Dnieper station and the steam power station of the Dnieper coal basin.

Among major water power resources the greatest in the European part of the Soviet Union is provided by the Volga and its prin tribes Oka and Kama. Utilisation of these resources is co-ordinated with river transport and irrigation projects. Recently completed is the upper Volga transport and power complex, which includes Uglich, Rybinsk and Ivankovo

hydro electric stations. The three stations together have a capacity of nearly 170 000 kw and an aggregate annual output of 1 400 000 000 kw. In the lower Volga region work is in progress on the largest hydro electric construction in the world, the Kuibishev hydro centre on the Samara bend of the Volga, a combination of two new power stations with a total capacity of 3 400 000 kw. In conjunction with the upper Volga developments the Kuibishev project will convert the Volga and its tributaries into a magnificent deep water transport system.

a few monopoly trusts combine all the enterprises of any given branch of industry in the whole Union e.g. the Urals Asbestos Trust, the Rubber Trust, the Silk Trust etc. In some industries there are several trusts e.g. in the oil and cement industries. In the majority there are a number of separate trusts in the various parts of the Union. About 10 per cent of Russian industry is run on co-operative lines (for details of the industrial organisation in Russia under *The Soviet Economic System*).

Russian industry had developed to a



THE RIBUHT DAM AT DNIROPETROVSK 1950

The largest power station in Azerbaijan is that of Mangishchaursk, situated some 260 km from Baku on the Kura R., where it enters the Caspian plains. This station has a capacity of 300 000 kw. Irrigation for cotton growing is also associated with this project and industries in the Baku region utilise its power. Besides cotton growing there was just before the Second World War a vast development of new industries such as chemical machine building, clothing, food, etc. Plans for Uzbekistan provide for a dozen plants with a combined capacity of over 1 500 000 kw. Several of the stations with a capacity of over 270 000 kw have been completed and serve as a foundation for the establishment of an electro-chemical combine the output of which after full development will almost entirely meet the fertiliser requirements of the cotton fields.

Industry—The Russian industrial system is based on the Socialist theory of state ownership of the instruments and means of production. In certain industries

considerable extent before 1917 (see *History*) but the Bolshevik regime completely transformed industrial organisation substituting state ownership for private ownership and under the N.E.P. (1917) and the five year plans (1928) industrial progress has been launched which have completely altered Russian economy. The capacity of the established industrial area has been increased by modernisation of equipment, Soviet productivity improvements and the building of many new factories etc. while industrial areas have been created in parts which until 1917 were purely pastoral or agricultural. Russian industrial progress after the revolution was planned on a system of natural priorities. The first five year plan produced electrification, some extension of internal communications and a considerable development of heavy industry. The second five year plan continued the development of heavy industry and began the expansion of the processing industries. The third five year plan paid considerable

attention to the armaments and chemical industries, but was intended to concentrate on the development of light industries. This plan was interrupted by the Second World War. The aim of the five-year plan 1946-50 was 'to rehabilitate the devastated regions of the country, to recover the pre-war level in industry and agriculture, and then considerably to surpass that level'. To achieve this it proposed to concentrate on the restoration and development of heavy industry and railway transport, to promote agriculture and industries producing consumer goods, and to promote technical progress in all branches of the national economy. Priority has, therefore, been given, since the inauguration of the first five-year plan, to the development of communications and heavy industry. There had been a considerable extension of light industry before the Second World War, but its quality and extent of modernisation were still uneven. The concentration on its development was delayed by the war and after it the devastation caused during the fighting had so affected those basic elements treated under the first two five-year plans (e.g. the first Dniepropetrovsk dam was destroyed by the retreating Russians as part of the 'scorched earth' policy in 1941) that the post-war plan had again to give priority to transport and heavy industry. The total volume of production of Russian industry as a whole for 1950 was fixed at 203,000 million roubles (in 1926-27 prices) as compared with 138,000 million roubles in 1940. This represented an increase in industrial output of 18 per cent, as compared with the last full pre-war year. In 1949 it was reported that industrial output was slightly above this planned level, though in some branches of industry the level set for the utilisation of equipment was not reached. The government stated that the labour productivity of manual workers in industry in 1949 was 13½ per cent above that of 1918. In several cases consumer goods were stated to be more plentiful in 1949 than they had been since the revolution. No impartial figures on output are available, but dismissals of high officials in certain industries suggest that the government has not in fact been entirely satisfied with the progress made.

In 1940 there were nearly 600,000 industrial enterprises, of which 10 per cent were large concerns. The industrial output of the R S F S R alone was 8.5 times as great as that of R in 1913. The principal industries of the R S F S R were iron and steel, textiles, engineering manufactures of agricultural and industrial machinery, rolling stock, building materials, and road vehicles, paper and timber products, ceramics and glass. After 1917 entered the Second World War, a number of new large industrial and transport undertakings were begun in the interior of the country. These included the blast furnace at Magnitogorsk and the Chelyabinsk iron and steel works, claimed to be the largest in Europe, and the rivet blast furnace at Chusovaya. Tanks and tractors were manufactured in Siberia, and sev-

new power stations were established in the Central Urals and in Krasnogorsk. New blast furnaces and steel works, and engineering and chemical works, were set up in a group of towns lying between the Ob and the Altai Mts. Novosibirsk, Leningrad, Kemerovo, and Stalinsk. Hydro electric stations have been erected to drive the saw mills, cellulose and paper mills, and the mining enterprises of this region. Iron and steel works have been established at Khabarovsk and Komsomolsk, close to the Pacific coast. These industries did not suffer destruction between 1941 and 1945, as did many of the older industries in the West, and were easily transferred to a peace time basis when the war ended. One of the most outstanding Russian industrial achievements outside the R S F S R since the revolution has been the creation of the cotton manufacturing industry in Uzbekistan, Tadzhikistan, and Turkmenistan, where irrigation has resulted in a great increase in cotton production and where modern cotton-mills have been developed near the cotton-fields in Tashkent, Bishkek, Stalinsk, and Ashkhabad. For a list of the principal industries in each of the S S R's (excluding the R S F S R) see under AZERBAIDZHAN, ESTONIA, WHITE RUSSIA, etc.

Minerals and Chemicals.—Russia is very rich in mineral wealth. Soviet geologists claim that their country contains one-fifth of the world's coal deposits, nearly 60 per cent of its oil, over 50 per cent of its iron ore, and two-thirds of its apatite. No reliable information exists about uranium deposits. Russia has sufficient deposits of non-ferrous and rare metals and chemical ores to meet the demands of Russian industry for an indefinite period.

Coal and iron were extensively worked in tsarist Russia, but mineral resources in Asiatic Russia remained unexplored, and in European Russia mineral wealth was not fully exploited. Since the revolution the industrial basis of European Russia have been extended, and the production of coal, iron and steel has greatly increased. Iron ore deposits in the Urals and West Siberia are now fully utilised. The Altai Mts., the Urals, and the Sayan Mts. also contain gold, silver, copper, chrome, tungsten, nickel ores and magnesium etc. There are plentiful supplies of petroleum at Keri, Baku and Tama. Other minerals found in smaller quantities in the U S S R include lead, platinum, tin, bauxite, and zinc. Precious stones are found in small quantities. In 1940 166,000,000 tons of coal were produced in Russia, 15,000,000 tons of pig iron, and 18,300,000 tons of steel. The five-year plan (1946-50) provided that the pre-war production figures for iron and steel should be increased by 35 per cent. It provided for further exploitation of iron ore resources in the Urals, Siberia, and the Far East. The plan set new targets for the production of other minerals, and stressed the importance of erecting new plants to deal with the new resources tapped, and of achieving the maximum technical efficiency. It was claimed in 1949 that all these aims were being achieved.

The Russian chemical industry has in the main grown up since 1917. Its most important products are synthetic rubber, fertilizers, soda, and plastics. The output of synthetic rubber in the Urals was, in 1950, greater than that produced in the older centres at Voronezh, Yaroslavl, and Izmovo.

Commerce—R's foreign trade is a state monopoly. Control of it is vested in the Ministry of Foreign Trade, which alone issues the licences under which goods are imported and exported. Trade delegations accredited to foreign countries purchase the necessary imports and effect the sale of Russian products. Under the control of these trade delegations, certain state and co-operative bodies can by special licence be selected to engage in foreign trade. Between 1934 and 1938 exports averaged 1570 million roubles, and imports 1038 million. In 1938 Britain exported 241 million roubles' worth of goods to R and received 375 million roubles' worth of Russian exports. In the same period the U.S.A. exported goods valued at 406 million roubles into R, and took Russian goods amounting to 97 million roubles. Other countries trading with R in 1938: Holland, Belgium, Germany, France, and Persia. Trade figures of commerce since the Second World War are incomplete. Board of Trade returns show that total trade between Britain and Russia in 1947 and 1948 was as follows: Russian imports to Britain 1947 £7,536,490. British exports to Russia, £12,272,396. Russian imports to Britain, 1948 £27,047,676. British exports to Russia £3,310,437. Machinery is (1950) the most important Russian import.

Retail internal trade in R has three forms: state co-operative and the free market. In 1940 rather more than 60 per cent of the retail trade was done by the state, roughly 20 per cent each by the co-operative organisations and in the free market. Until 1946 consumers co-operatives only traded in the rural areas but in that year they were permitted to develop their retail trade in the towns. As a result half of the retail trade within the U.S.S.R. was done by them in 1948. They had 220,000 stores and an organisation comprising nearly 6,000 societies.

Communications—The importance of the Russian rivers as means of communications is because of their divergence very great. It is however diminished to some extent because of the long season during which many of the rivers are frozen. Before the revolution the river and canal system of R was mainly used for carrying freight, since 1917 the waterways have become important as a means of passenger transport. It is claimed that 3,000,000 passengers were carried in 1929 as against 11,000,000 in 1913. The Soviet Govt. has built many new canals and has widened existing canals and deepened rivers to take larger vessels. Soviet achievements include the White Sea-Baltic Canal (1933), the Moscow-Volga Canal (1937) and the Dnieper-Bug-Vistula Canal (1939). This last connected the Baltic and Black Seas

by water. In 1941 traffic on Soviet waterways amounted to 74,000,000 tons, and there were 63,125 m. of inland waterways in regular use. The five-year plan (1946-50) included plans for widening and deepening existing waterways and for building others, particularly in Siberia and the Far East. Canals were also to play a part in the steppe irrigation project.

A system of Russian railways had been built up before the revolution. Though uneven in quality, they did link together the different sections of the empire, though they were most numerous and efficient in Europe and in the Soviet Govt. used the tourist system as a basis for its railway plan. New lines were built especially in Asiatic R and modernisation of equipment began. Soviet lines built before the Second World War (including some begun under the tsars but unfinished in 1917) include the Murmansk line, the Krasno-Sverdlovsk line and the Irkutsk-Siberian line. In 1945 there were 66,000 m. of railways of which 30 per cent were double track lines. The Russian railway system in 1950 provided communications between Leningrad and Moscow and all the major cities of the U.S.S.R., though in some cases the journeys were still slow, and passenger accommodation comfortable. Electrification of suburban lines in Moscow, Leningrad, and Tallinn and of main lines in Siberia, Transcaucasia, and the Far East, is in progress. Stress was laid on further railway development in the five-year plan (1946-50). Lines destroyed during the Second World War were to be fully restored and extended. Russian experts admit that the difference in gauge between R and W Europe is a major obstacle to direct rail communications between the U.S.S.R. and foreign countries.

Road communication was still of subsidiary importance in 1950. It had been extensively developed by the Soviet Govt. but only a few main roads outside the huge towns approached W European standards. In 1945 220,000 m. of roads could be used for motor traffic and roads were to be improved and extended under the five-year plan (1946-50). Civil aviation commenced in 1922 and civil airlines used in 1948 had a total length of over 13,000 m. Moscow is the centre of air traffic. Air lines are especially valuable in Siberia and the Far East. In 1940 civil airlines carried 390,000 passengers and 60,000 tons of freight and mail. Civil aircraft are also used in emergency against pest.

Post—Post office telegraph and telephone services have all been developed under the Bolshevik regime.

The Soviet merchant marine operates mainly in the Baltic and the Black Sea. In 1939 its gross tonnage was 1,150,000 gross tons, but later figures are not available. These are comparatively few for a world seaport.

CONSTITUTION AND GOVERNMENT—In 1922, after the last foreign invader the Japs had been expelled from Russian territory, an All Union Congress of Soviets was held at which the U.S.S.R. was formed.

by the union of four republics the R.S.S.R. (Russian Soviet Federative Socialist Republic), the Byelorussian (or White Russian), Ukrainian and Transcaucasian Soviet Socialist Republics. The Treaty of Union including the Constitution of the Union giving equality to all nationalities within the Union was adopted by the Central Executive Committee of the U.S.S.R. on July 6, 1923, and finally ratified the succeeding year. Later a number of other autonomous republics were declared constituent members of the Union. At the Eighth Congress of the Soviets in Dec. 1936 a new constitution was adopted known widely as the Stalin Constitution. According to the constitution (as variously amended) which is declared to be the fundamental

law of the Union, the Soviet Union is a socialist state of workers and peasants, the political units of which are the soviets or councils of workers and peasants deputies. All central and local authority is vested in these soviets. In 1936 the U.S.S.R. consisted of eleven republics, but by 1940 after the admission of the Karelo-Finnish, Moldavian and Baltic republics there were sixteen large Union republics, and within these another sixteen smaller autonomous republics, nine autonomous regions and six territories. For the Union as a whole the supreme law-making body is the Supreme Soviet of the U.S.S.R., which is divided into two chambers. The first is the Soviet of the Union elected by all citizens on the basis of one deputy for every 300,000 electors. It numbers about 600 deputies and elections take place quadrennially. The second chamber, the Soviet of Nationalities, is elected by the citizens of the U.S.S.R. according to Union and autonomous republics, autonomous regions and national areas on the basis of twenty-five deputies from each Union republic, eleven deputies from each autonomous republic,

five from each autonomous region and one from each national area. It thus affords a means of giving each of the large national republics an equal voice, irrespective of the population of each. It has some 570 members representing some sixty different nationalities. Either chamber can propose laws but any law must have the agreement of both chambers. The Supreme Soviet is normally convened only for two sessions each year. To carry on business in the interim and to work out the details of laws, it elects at joint sessions of both chambers a presidium of thirty-three members; the latter appoints the Council of Ministers. This council the highest executive and administrative organ of state power of the Union consists of the heads of each of the ministries



A SOVIET
ELECTION
TOSTER 1930

This emphasizes
the equality of
all citizens in
the election of
the U.S.S.R. The
election at the
Central Hall
of the U.S.S.R.
Soviet Union

ДА ЗДРАВСТВУЮТ РАВНОПРАВНЫЕ ЖЕНЩИНЫ

A Soviet Press

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Ten and village soviets direct the work of subordinate administrative organs and control local affairs. Run small local industries, schools, hospitals or clinics and the building of houses, do road and bridge repairs, conduct the administration of justice in the local people's courts, and maintain the children of poor families. Village soviets also regulate markets and supervise farms in the locality and woods and forests and the cutting of timber.

According to the constitution the economic foundation of the U.S.S.R. is the Socialist system of economy and the Socialist ownership of the means of production and the abolition of the exploitation of man by man consistently with the principle that he who does not work neither shall he eat. There are constitutionally two forms of Socialist property: state property or property of all the people and co-operative and collective farm property (*kolkhozy*). Natural resources, public utilities, banks, roads and railways, large specialist agricultural enterprises, machine and tractor stations, municipal enterprises and the dwelling house properties in urban and industrial localities are state property (see further under the *Soviet System of Economy*). The right of personal property of citizens in their income from work and in savings in dwelling houses, furniture, utensils and objects of personal use as well as the right of inheritance of personal property of citizens are protected by law. The constitution affirms the right of all citizens to work, rest, leisure, education and maintenance in old age, sickness or incapacity without distinction of sex, race or nationality and provides that any restriction of the rights or conversely the establishment of privileges for citizens on account of race or nationality as well as the advocacy of racial or national exclusiveness or hatred or contempt is punishable by law. It provides for freedom of speech, press, assembly and

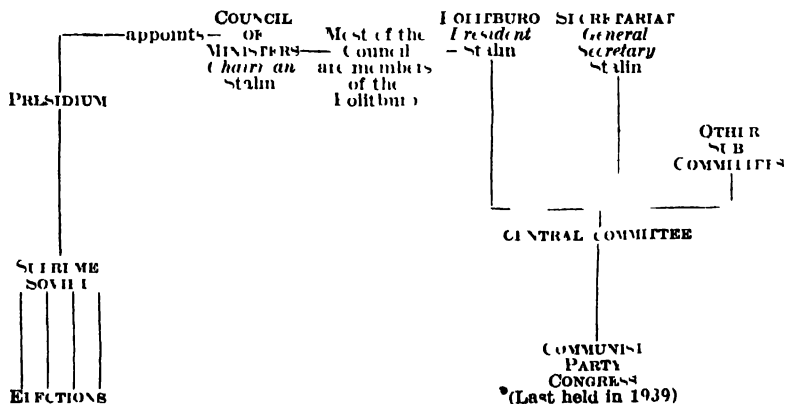
street processions. Military service is recognised as the sacred duty of the citizens and universal military service is the law of the land. Citizens of the Red Army have the right to elect and be elected to soviets on equal terms with all other citizens. The constitution also refers to freedom of conscience and 'of religious worship' (see further under *Religion*).

The constitution of 1936 was amended in 1944 by providing that each constituent republic of the U.S.S.R. should be entitled to have their own commissariats for defence and for foreign affairs but in matters concerning foreign affairs it is provided that the commissariat of the U.S.S.R. shall deal with all questions concerning the interests of the Union as a whole and at the same time that it should also have a voice in the general character of the foreign policy of the constituent republics. Thus this 1944 constitutional modification is more nominal than real and its true purpose probably was to secure for Russia sixteen seats instead of only one at the peace conference following the Second World War.

As in the 1923 constitution so in the new one the right of the constituent republics to withdraw from the Union was expressly recognised. Each constituent republic retains its own separate Supreme Soviet and Council of Ministers. Certain of the ministries, however, are the exclusive prerogative of the Union Government, who control such activities as foreign trade, heavy industries, etc. throughout the U.S.S.R.

It should be noted that the functions of judicature, legislature and executive are bound to blend one into another in a system where no large body of case law exists to act as referee and where so much authority is delegated.

The Communist Party—The system of a regularly elected Supreme Soviet and the Presidium is however but a facade



THE ORGANISATION OF POLITICAL POWER IN RUSSIA

of power and the gov. of R. in fact is absolutely controlled by the Communist party. The party is the sole legal party in R. Its divs. correspond to the territorial divs. of the state. Local conferences of the party members elect delegates to regional conferences and the latter send delegates to the Soviet Union Party Conference or Congress which last met in 1939. A central committee of seventy-one members is theoretically elected by the Congress, since 1933 the committee has co-opted its members

receives instructions from the superior organs of the party and in every factory and collective farm there is a Communist cell which directs the technical administration of the factory or of the *kolkhoz*. In this manner the members of the party distributed over the whole state system represent the controlling power behind the state machine. The purity of the party policy and strict discipline are preserved by thorough investigation of the political and social activities of each member. Though much



THE POLITBURO (1941)

Stalin sitting to the far left illustrating the Stalinist method of the Politburo. In the center is the tall Molotov, Shverdkin, Beria, Mikoyan, Kaganovich, and others. Stalin is on the far left, and the tall Molotov is in the center. The other members are seated around the table.

Various subcommittees are appointed the two most important being the party secretariat over which Stalin as general secretary has presided since 1922 and the Politburo which holds the main threads of administrative power and the president of which is Stalin. There are (1930) about twelve members of the Politburo plus some associate members. Their decisions are carried out by the Council of Ministers promulgated by the Presidium and given retrospective legislative sanction by the Supreme Soviet. The diagram shows the twin popular and party structures and the supremacy of Stalin in his executive capacities. The party Central Committee, Secretariat and Politburo are the organs of real power in the U.S.S.R. The Communist group in every locality

freedom of discussion may be all well before a decision is taken, once that is done, absolute loyalty to the 'party line' is demanded, and the decision on what is to be in fact the party line on any given subject at any particular time rests with the party leaders. The party can never be wrong and it is this attitude with the complete absorption in the party of a member's life which explains the confessions and expiations witnessed at the many trials of aging members who were thus performing one last service for party infallibility.

Security and Justice—The early difficulties of the Soviet state and the struggle within the Communist party gave a particular importance to the question of security and to those organisations con-

cerned with it. The tsarist Ochrana was restored as the *hukla* reorganised in 1923 as the G P U (Ogpu). After the 1936-38 purges this was renamed the N K V D (*q v*) (People's Commissariat for Internal Affairs) which, after the Second World War, was divided into the M V D (*q v*) and M G B organisations which shared out the work in proportions impossible to define. State security is a Union Republican ministerial concern. It would seem that the uniformed militia shades off from normal police work into the army and the plain clothes dept from detective work into the party. The M V D controls a large body of forced labour under the 'corrective labour code', by the use of which outlying regions have been developed and large projects carried out. Moreover every phase of Russian life is permeated by the activities of the M V D.

The criminal law is founded not upon Roman Dutch law but in the words of an official statement upon 'a logical and consistent materialism'. It is an integral part of the policy of the workers' state and it serves as a weapon against the enemies of the proletariat whilst in the second place it is intended to foster a spirit of social discipline and self discipline in the links of the working class. There are Union and Republican sections of the criminal code and crimes are categorised as against the Soviet system these being the more heinous and others. There have been many conflicts over judicial philosophy causing changes in the application of the law usually between extreme Marxism and the wider historical attitude of authorities such as Krimm.

The basis of the judiciary system is uniform throughout the Union but the constituent republics may introduce modifications. The supreme court of the U S S R is the chief court and supervising organ for all the republics and is elected by the Supreme Soviet of the Union for five years. Similarly supreme courts are elected for the constituent republics by their supreme soviets. In all courts cases are tried with the assistance of people's assessors except where otherwise provided. All cases are heard in public save where provided otherwise by law and the accused is guaranteed the right of defence. Broadly there is little difference between the code of laws and their application in the separate republics and the legal system of the R S S R may therefore be regarded as typical. The courts of the R S S R are divided into people's courts and special courts. The former consist of the people's judge and two assessors. They are courts of first instance for the trial of most civil and criminal cases except the more important cases some of which are tried before the regional court, while cases of the highest importance go before the supreme court. The regional courts exercise supervision over the people's courts besides acting as courts of appeal from the former. The supreme court exercises supervision over all the courts, and is an appeal court from the decisions of the regional courts. People's courts or courts of lowest in-

stance are elected by the citizens of each district for a term of three years and judges may be recalled for failure to perform their duties. Assessors are called upon from lists of persons elected by the citizens of the rural districts, industrial enterprises, collective farms, army corps and so forth. Those for the regional courts must have had experience in public work or in trade unions. The list of assessors for the supreme court is drawn up by the supreme court of the republic. Besides the people's courts there are special courts, labour courts for the supervision of labour disputes, working conditions etc., rural commissions for the settlement of agrarian disputes, arbitration committees for the settlement of disputes between the various state organs concerning property rights, military tribunals which deal with military offences, cases of espionage and other classes of crime, disciplinary courts for the trial of offences including neglect of official duties committed by members of the Central Executive Committee and similar state organs. These special courts are elected for a term of five years by the supreme court of the republic.

The state chief prosecutor is appointed for a term of five years by the Supreme Soviet. All the prosecutors of the republics, autonomous republics and regions are appointed by the procurator of the U S S R for a term of five years. The duties of the public prosecutors are the supervision of the faithful application of the law by all state organs. The prosecutors of the federated republics are subordinate to the state chief prosecutor whose duty is to see that acts of all institutions of the U S S R are legal and that the law is rightly interpreted and uniformly applied besides participating in important cases in his capacity of state prosecutor.

The independence of the judiciary was vitiated by a decree of July 1945 setting up disciplinary bodies to deal with and to impose penalties for judges' breaches of duty. Again in Aug 1948 a number of supreme court judges were replaced by an executive decree *a fait accompli* ratified by the Supreme Soviet until March 1949. The supremacy of the executive is established by the powers given to the security organisations to arrest and imprison without any interference from the ordinary courts and by its control over the expression of views which permits it to disregard the law without fear of criticism.

In two spheres important legal change were effected in 1944 and later. Marriages must now be properly registered and divorce laws were adapted to counter a frivolous attitude to family responsibility. In the sphere of private property the government has been to encourage its acquisition and several legal changes were made. *E.g.* inheritance law was abolished in 1942 the right of bequest and inheritance was enlarged in 1945 and in 1948 the citizen was given a perpetual right over land on which he had built a house.

DEFENCE—In 1925 a conscription law was passed by which all workers and

peasants underwent training at the age of nineteen, service with the colours at the age of twenty one, and subsequently two months' training a year. Other classes formed 'working battalions' or paid a military tax. The constitution of 1936 established universal military service. A decree of Dec. 1941 by which all male citizens had to do 110 hours' military service per year, was still in force in 1950. Elementary military training is given in all schools to children between the ages of twelve and fifteen, and pre-army training to children between fifteen and eighteen in the secondary schools and in technical and factory training schools attended by young persons of corresponding ages. Students of higher technical institutions who have not served in the army, also undergo similar pre-army training. There are also officer cadet schools for regular officers. The strength of the army and of its reserves is not published. For further details about the army see under RED ARMY.

At the outbreak of war between R and Germany in 1941 the Russian Navy was believed to consist of 4 battleships, 7 cruisers, 3 destroyers, 170 submarines and 150 minor craft. According to the programme of construction announced in Aug. 1939 the navy was to have been entirely reconstructed and considerably strengthened by 1942-3. It was also proposed to widen the canals to enable capital ships to pass from the White Sea into the gulf of Finland and the Black Sea. Kronstadt is a naval base was rebuilt. Subsequent naval strength is unknown, but in 1949 it was believed that at least 5 battleships, 10 cruisers, 60 destroyers, 250 submarines, 15 torpedo boats, and a number of auxiliary vessels were in service. In Feb. 1948 R received 45 warships as the Russian share of the 1st Navy. There are naval dockyards at Leningrad, Nikitaev, Sevastopol, Molotovsk, Vladivostok, and Komsomolsk. The role of the Red Navy in the Second World War was primarily a defensive one fought in close co-operation with the Red Army. It played a part out of proportion to its size. The task of the Navy fleet in the White and Barents Seas was to keep open the sea route to Britain and the U.S.A. This fleet which consisted largely of submarines, cutters and seaplanes did valuable service in assisting convoys and in harassing Ger shipping; it is claimed that it sank 500,000 tons of Ger shipping. The Baltic fleet defended Leningrad and dominated the region of Hango in Finland and it assisted the Red Army in the drive to the Baltic especially at Tallinn and off the shores of E. Prussia. The Black Sea fleet distinguished itself before Odessa and Sevastopol and along the coast of the Caucasus region. In no instance did the Red Navy permit landings of hostile forces in the Black or Baltic Seas behind Russian lines. In the first three years of the war the Red Navy is said to have sunk 1 auxiliary cruiser, 2 armoured coastal defence ships, 37 destroyers, 50 submarines and numerous light craft. The Red Naval Air Force brought down more than 6000 enemy planes. In these

various operations, however, considerable losses were incurred.

There are air forces attached to the army and the navy but their strength and character is not known. It has been suggested that R possesses 15,000 war planes with a reserve of over 10,000. Jet aeroplanes were publicly demonstrated in July 1949.

RELIGION—Vladimir I. accepted Orthodox Christianity in 989 and this remained the established religion of R until Jan. 23, 1918. It was followed by the majority of the pop. though there were many religious minorities, some of them large: e.g. Uniates, Lutherans, Rom Catholics, Jews, Muslims. These suffered varied degrees of persecution from time to time. In tolerance was marked towards Jews, Uniates and Rom Catholics. In the case of the latter two groups this was frequently largely because Catholic elements were also members of one of the discontented national minorities.

In 1889 a Russian patriarch was consecrated by the patriarch of Constantinople, and the Russian Church became autonomous. After the fall of Constantinople R regarded herself as the champion of Orthodoxy and this attitude gave secular Russian designs on S.E. Europe a popular appeal. The Church became divided into 'Old Believers' and 'New Believers' after a liturgical quarrel in the seventeenth century. The close connections between Church and State led to some of the hatred felt by revolutionaries towards the State being directed also against the Church. The Church had in fact frequently suffered from the State. Peter the Great had abolished the patriarchate and Rasputin managed Church affairs according to his personal whims. The Church was a very large landowner and undoubtedly contained in many abuses, but elements within it were desirous of reform. The liturgical quarrel marks the date at which the educated classes began to despise the Church as an institution. But its essentially liturgical character preserved its general popularity and devotion to it prior to 1917 seems to have been wholehearted.

From the revolution of March 1917 all citizens might belong to any religion. The Bolshevik decree of Jan. 23, 1918, disestablished the Orthodox Church. Its property was appropriated by the State. A limited number of churches, however, were loaned to their congregations which had to maintain them themselves though they were allowed the free use of the building. Religious teaching in schools giving general education was forbidden. The constitution of 1918 specified freedom of religious and anti-religious propaganda, but the former was omitted in a later revision. Between 1918 and 1941 the Church suffered under severe disabilities, and during the period 1929-35 was openly persecuted. Many priests were imprisoned, though the gov. stated that they were not imprisoned on religious grounds. The gov. admitted the continuance of religious faith, however, and the Stalin Constitution of 1936 enfranchised the

clergy and did not contain any anti-religious legislation.

The Orthodox Church and other religious groups wholeheartedly supported the Soviet Gov. during the Second World War, anti-religious activity apparently ceased, and the Metropolitan Nikolay was appointed member of a gov. commission to investigate war atrocities. Between March and Oct. 1918 the Church had considerably reformed itself and elected a patriarch, but upon his death in 1925 no successor could be chosen. In 1913 however the Metropolitan Sergei was elected patriarch and was succeeded by Patriarch Alexei in 1943. A Soviet Council for Orthodox Church affairs was established in 1913, while a separate council dealt with the affairs of other religious denominations. A monthly *Journal of the Moscow Patriarchate* was instituted. Church internal organisation was reorganised and expanded.

At the end of the Second World War in understanding seemed to have been arrived at between Church and State, but the actual freedom of the Church would appear to be strictly limited, and the ban on members of the Communist party belonging to any religious community remained. Observers reported large congregations, but the churches open were limited in number. In 1943 there were 20,000 Orthodox congregations with 30,000 priests, 87 monasteries and convents, 10 seminaries and 2 theological academies. The number of church members is not known. Information about other religious communities is small, but Roman Catholics are known to suffer under great practical disabilities. In 1940 it was suggested that the attitude of the gov. to religion was hardening.

Education. To support the Soviet Socialist economy and way of life the Communist party and the gov. have developed an elaborate educational and propaganda system. In the early years of the regime there was much experimentation in methods of education which was regarded a duty as well as a right. Illiteracy was high amongst the lower classes under the tsarist regime even though a state system of education had been introduced in the time of Catherine the Great and large-scale and successful efforts have been made to reduce it throughout the territory of R. Asiatic and European. In 1913 sov. changes were made in the light of the experience gained, e.g. the need for discipline was recognised and punishment allowed and coeducation for adolescents abolished. At the base of the system are crèches and nursery schools in towns and villages, parents paying as they can afford. Free universal, and compulsory education is provided in primary and junior secondary schools. Entering the former at the age of seven, children at twelve go on to the latter, or to occupational schools. One million boys each year undergo an industrial apprenticeship in the occupational schools. Most children leave school at fourteen, a minority continuing in the secondary schools till seventeen. From

the senior secondary schools and technical colleges are drawn the leaders of agriculture and industry. Working classes are widely organised and the party and the trade unions provide opportunities for adult education. In the higher schools and univs. the general standard has been raised in later years. The practical sciences have lost their former strong preponderance and a broader education in the humanities is now provided. However dialectical materialism is the accepted philosophy, the study of which with Lenin-Stalinism is compulsory. Fees are paid for higher education and scholarships and grants are restricted to exceptional pupils. Even before 1933 children from the professional classes comprised 40 per cent of the students. The Soviet Gov. has opened many new univs. throughout the Union, as at Kuzbass and Ulanovsk, in addition to those surviving from tsarist days such as the two in Moscow and those of Kazan, Leningrad and Tomsk. Higher education is dealt with by ministries in each republic. In 1945 there were 198,000 primary and secondary schools with 32,000,000 pupils and 840 higher educational establishments with 731,000 students. Technical institutes had 1,093,000 students. In addition there were Suvorov military schools, trade music art and theatre schools, higher medical schools and medical research institutions.

For young children from seven to fifteen there is a party organisation, the Pioneers, resembling the Scout movement in some of its activities. For youths from fifteen to twenty-five there is the Komsomol, the real training ground of the party, whose seriousness of purpose does not attract all Russian youth. The state extends large sums to this organisation and it offers considerable advantages in educational facilities, etc. to its members.

History. Very little is known about the pre-history of R. There are vast expanses of territory which are as yet almost unexplored, and the official propaganda which permeates Bolshevik historiography has made it difficult to assess the real value of research done since 1917. Russian history before the coming of Lenin (1917) is also obscure and confused. Until the beginning of the ninth century the inhabitants of R. were mainly Slav, Finnish tribes who had entered R. from the W. and who were unable to maintain any order in the country in which they had settled. These tribes must have contained considerable Frank and Gothic admixtures, as in the fifth century B.C. for example advanced Scythian and later Sarmatian civilisations flourished around the Black Sea and had contact with Greek civilisation. Later these civilisations were destroyed but they left traces in the Russian language and their peoples were absorbed by the invading tribes.

The Viking Settlements.—During the ninth century the Russian tribes gradually came under the influence and domination of invaders from the N. who for a time ruled them and demanded payment of tribute, and from this time the first clearly

denuded period of Russian hist. dates. But these Vikings were driven out of the country by a general insurrection of the Slav tribes who lived in the neighbourhood of Lake Ladoga and for a time the country again became Slav and Finnish. But the invasions of Magyars and Pechenegs from the E. seem to have decided the Slavs of Novgorod to call back the Vikings who came from a country (possibly Denmark or even Normandy) called Rus. The chief of the Northmen who returned was called Rurik and many Russian nobles claimed descent from this ancestor. The Vikings settled in R. ruled the country as military chieftains maintained order, estab. a system of law which was strictly Scandinavian in derivation and were finally assimilated with the original inhab. of the country itself. However they estab. no kingdom and although they set up a number of principalities and for a time were regarded as a power in Europe there was no real unity amongst the various components of this strange conglomeration of states and disorganisation and anarchy soon prevailed. The principalities were split up into still smaller districts, the princes quarrelled among themselves, pretenders to the various thrones quickly appeared and civil war was the rule rather than the exception. Such is the general picture of Russian hist. from the tenth century to the middle of the thirteenth. The Russians had however penetrated to the S. and Kiev whose situation made it a focal point on the routes to W. Europe, Novgorod and Constantinople became the most important Russian city. The early Russians practised various pagan religions. Queen Olga became Christian in 987, but there was no national conversion until 989 when her grandson Vladimir accepted Orth. for Christianity and proceeded to enforce it on the country. The conversion was of great significance in the hist. of E. establishing as it did new codes of morals and justice and setting new standards of art and learning. Yaroslav (1019-55) was the first of the great princes. He beautified Kiev and formed many foreign family connections by marriage alliance. But after him R. became more and more involved in anarchy. Kiev was stormed and taken a time after time and the Russians gradually retreated northward to their original home at Novgorod. This had remained for a long the principal city of the N. and had been on the main route between Sweden and Constantinople, one of the great trade routes of the E. and Middle Ages and the type of gov. in Novgorod a merchant city was more enlightened and in a sense more democratic than that of any other principality. The greatest rival principality was Moscow, with a system of gov. which differed essentially from that of Novgorod and which was despotic in form. Continual warfare raged between these two states, to be terminated by the arrival from the E. of hordes of Tartar invaders who threatened the safety not only of Moscow (which was directly in the line of invasion) but of Novgorod

also and through these states W. Europe.

The Tartar Invasions—The Tartar invasions mark a new phase in Russian hist. During this period R. had degenerated since the days of Rurik and was now threatened with annihilation. Already the S. portion of R. had suffered from the invasion of the hordes of barbarians from the steppes now these swept down to the more civilised parts of R. itself. The attention of the Russian princes had been drawn to the possibilities of invasion by the fact that the tribes on their E. border had already suffered invasion at the hands of a Tartar enemy. These had applied for aid to the Russian princes pointing out that the fate which now threatened them would be meted out to R. if the Russian princes did not come to the rescue. They came but met with an overwhelming defeat in 1223, but the Tartars although victorious retired and for a time were not again heard of. In 1237 however they returned in greater numbers and invaded practically the whole of R. sweeping down to the boundaries of the S. and penetrating almost as far as the Baltic. Finally however the leader of the Mongol and Tartar tribes settled on the banks of the lower Volga. But the Russian princes were held to be the vassals of the great khan who ruled over an empire which extended from China almost to the Baltic and which whilst it had no unity was nevertheless held together by an immense army and had a intricate system of taxation. The Mongols interfered little with the religion of the Russians. They were themselves at first idolaters, but later became Muslims and as such did not import radically from their principle of taxation but the annual tribute which they exacted weighed heavily on the Russian princes. This system continued while the Mongolian Empire was kept together in its original strength by a single ruler but gradually the power of the great khan began to decline. The empire began to fall to pieces, it no longer had a ruler capable of controlling so vast a realm and the result was that gradually the Russian princes began to assert their independence. Chief amongst the rulers of R. was Dmitri Donskoi prince of Moscow, whose state had gained prestige when Moscow became the home of the heads of the Church in the fourteenth century. Organising the Russian princes he gained a great victory over the Khan of the 'Golden Horde' (the name given to that part of the Mongolian Empire which bordered on R.) at Kulikovo (1380). The power of the horde was breaking up rapidly, and was soon nothing but a conglomeration of independent Khanates.

Russia in the Late Middle Ages—The leader of the coalition of the Russian princes who had overcome the power of the 'Golden Horde' now assumed the title of grand prince of R. and with the beginning of his authority the third definite period of Russian hist. begins. Dmitri, however had little, if any, real power over the princes of the other inde-

pendent principalities, but he was the founder of the family of princes of Moscow who were to establish a real sway over practically all that part of Europe which is now called R. By the beginning of the fifteenth century the power of the Mongols was virtually at an end and the Russian princes of Moscow were occupied in extending their own as far as they possibly could. The princes of Moscow were recognized as the grand princes of R, but were regarded simply as *primus inter pares*. They were soon, however, to show their greatness of their power. The first great ruler of R was Ivan III (*q.v.*). He and his grandson Ivan the Terrible were



Ivan the Terrible

IVAN IV

A scene from the film *Ivan the Terrible*. The tsar, who had turned to Muscovites after betraying Lithuania by his father, falls down from a hilltop on a procession of captives from Moscow come to plead for his return.

responsible for the shaping of the empire of Moscow on which the later Russian Empire was established (*q.v.*). Until the accession of Ivan III, the power of the Dnieper boyars (*q.v.*) still remained great in Moscow. In 1462 Ivan III succeeded to the throne of Moscow. He immediately proceeded against the republic of Novgorod and was finally successful in completely overcoming it. He instituted a new form of government, being influenced very largely by Gk ideas, since he married Sophia, a Byzantine princess and daughter of Thomas, brother of the Emperor (Constantine) Palaiologus, and in her train came a great number of Gk followers. He depended for service in the state upon men whom he himself had raised from the ranks of the commoners, and did all he could to destroy the power of the boyars. He extended the territory over which he ruled to

the Arctic Sea and to the Ural Mts., and he made Moscow the greatest city of R. During his reign the Tatars made their last attempt to re-establish their power over the Russian princes. But faced with an enormous army gathered together by Ivan, they withdrew (1480) and did not again attempt to invade R. Ivan again influenced by the ideas of the Gk court, took upon himself the position originally occupied by the khans: he demanded the homage of the Russian princes and surrounded himself with all the pomp of Constantinople. In 1497 he issued his *Sudbnik* or Book of Laws, the second Russian code after the *Russkaya Pravda* of Yaroslav. Ivan was the first of the rulers of R to style himself 'ruler of all R'. The great enemy which R had now to face was Lithuania. At that time joined to Poland. The policy of Ivan was continued perhaps even more severely under the rule of his son Basil III, who won Smolensk from the Lithuanians, finally crushed a revolt in Novgorod, and conquered the last of the independent republics in Pskov. He died in 1550 after a reign of twenty-eight years and was succeeded by his son Ivan IV (*q.v.*), surnamed the Terrible.

Ivan was only three years of age when he was proclaimed ruler of all R. The boyars seized this opportunity to revive their power. They had many supporters, for the princes who had been dispossessed by the growing power of Moscow and many of the Slav families who disliked the pomp of the Gk court helped to restore boyar power. The boyhood of Ivan was spent in neglect and humiliation. R was again threatened with disintegration, but the power and strength of Ivan the Terrible saved it. Ivan recovered his power when he was sixteen and caused himself to be proclaimed tsar of all the Russians. The name had previously been adopted by Ivan III, but was not actually used by him except in his dealings with foreign states; it is a contraction of the name Cæsar. Ivan realised that it was necessary to crush the strength and power of the boyars, and he immediately began to do so with a terrible vigour which increasingly varied on madness, and which was made worse by the religious fanaticism with which he pursued his ends. The boyars and their families were hunted down and killed without mercy, and the feudal nobility was broken completely. During Ivan's reign diplomatic and trade relations were established with England. Ivan the Terrible was the first really autocratic ruler of Russia and he established the power of the tsar and carried on a long war with Lithuania which was successful at first but which finally became almost disastrous. In this he was supported by the general assembly (*zemsky sobor*) which he first summoned in 1547. Ivan's cruelty and his overshadowing great ability as an organiser. But his reign marked also a rapid growth in ecclesiastical corruption, owing to the immense wealth of the Church, and a further depression of the peasantry, whose position had been deteriorating since the Tatar invasions.

An important development of this period was the gradual advance of the Cossacks into Siberia. The pop of the S. dists of R had gradually acquired completely unique characteristics. They were continually pushing out eastward from the steppes in search of new lands on which to settle. These lands often swarmed with enemies and the settlers therefore took good care to defend themselves. The result was that a warlike and well trained race sprang up in the S. and pushed them way eastward, establishing as they went Russian supremacy over Siberia. Ivan was succeeded by his feeble son Feodor, and real power passed into the hands of the tsar's brother-in-law Boris Godunov. Until the accession of Boris to power the Russian peasant had still in theory been quite free. Boris initiated the legislation of a serfdom which had long been a fact in many dists. In religious affairs the Church in R had become more closely linked to the State when it appointed its own patriarch after Constantinople ceased to be the head of Orthodox Christendom.

The Accession of the Romanovs.—In 1598 Boris succeeded Feodor on the throne. He died in 1605 and immediately many impostors appeared who claimed to be Dmitri the brother of Feodor who was supposed to have been put to death by Boris. Before the death of Boris a man calling himself Dmitri had crossed the Russian border and supported by Poles and the Jesuits had met with a good reception in the country. He was regarded by many as the real heir to the throne and was after the death of Boris crowned in Moscow. The boyars however declared that he was merely the tool of Poland and he was murdered by Prince Basil Shuiski who seized the throne and was proclaimed tsar. A new impostor however put himself forward as a candidate and was recognised by the people who caused Shuiski to abdicate. Sigismund of Poland then put his son forward as a candidate for the throne and he was accepted by the Russians when he had promised to safeguard Russian interests. Polish troops had already entered Moscow, when Sigismund made it apparent that he himself intended to be tsar of R. This proved extremely unpopular and R saved herself in this crisis by a national rising fostered by the patriarch Philaret Ponomarev which drove the alien troops from Russia and placed on the throne Michael Romanov, Philaret's son the founder of the Romanov dynasty. The *zemsky sobor* had now lost the little power it had ever truly had; it did not even formally elect Michael who was acclaimed by a crowd in Moscow. Under the first of the Romanovs peace was made with Sweden but the war with Poland in spite of a short armistice dragged on until peace was made on terms which were not very favourable to R. The country during this reign had time to recover a little from the ravages which had been made during the previous period. Under Tsar Alexei who succeeded in 1645 serfdom was definitely established by a law promulgated in 1649. Many general risings

took place throughout R during this period and the Cossacks of the Volga also showed signs of unrest. Alexei himself did much to prevent the power of the Russian metropolitan from becoming too great. During his reign the metropolitan was Nikon who attempted to gain for himself the position which had formerly been occupied by the father of the first Romanov. He was aiming at the position of 'pope of the Greek Church' but his arrogance made him generally unpopular and he finally so exasperated the tsar that he was deposed. He had however done much to attempt to reform the Gk Church, although most of his reforms were regarded with horror by the majority of the Russian people and from this time the beginning of the isolation of the Church is an institution from the body of the people may be said to date. The struggle had not been one between the Church and the State but between extremely ambitious churchmen and the tsar nevertheless shortly afterwards during the reign of Peter the Great the patriarchate was abolished and the power of the patriarch placed in the hands of a synod. During his reign Poland was finally crushed by R and Smolensk became definitely a Russian town. The turn to the south was given by the Cossacks who appealed for help against the Poles to the Russians and who finally recognised the supremacy of R. The final unification of Cossack and Russian gave R the pre-eminence amongst the Slav races of Europe. As a result of the Russian claims on Little R during the next reign (Feodor III) war broke out with Turkey. R was finally victorious and in 1681 all Turkish claims on Little R were given up. On the death of Feodor Peter his half brother was proclaimed tsar by the Moscow mob influenced by the patriarch but Sophia his half sister for a time became the regent. She attempted to dethrone and ultimately to assassinate Peter but was finally overthrown and exiled to a monastery.

The Westernisation of Russia. Peter (q.v.) was now fully tsar and although his half brother Ivan also received the title the real authority rested with Peter whom later ages surmamed Peter the Great. For a time however Peter left the regency in the hands of his mother. He was however by his intimacy with foreigners and by his inquiry into their systems of government and administration preparing the way for that series of reforms which was to change the whole face of the Russian Empire. He realised that in order to become a power in W. Europe R must become a sea power. The only outlet which R had to the sea was in the N. and Peter determined therefore to gain an outlet for R, either in the Black Sea or the Baltic. He was successful at first in gaining a naval base on the shores of the Black Sea and he left the organisation of the fleet to a council of the boyars whilst he himself went on a tour throughout Europe which was to have such great influence upon the future of R. During this tour he visited Germany, Holland, England, France, and Austria.

Anything that he could learn or adapt, he assimilated without reference to the country or nation from which it was learnt. He was recalled from his tour by news of fresh rebellions in R and he returned to crush with renewed vigour a conspiracy which was practically at an end before he returned. He now devoted the rest of his life to R. He gained after a twenty years' war with Sweden an outlet to the Baltic, and although he was forced by a crushing defeat by the Turks to give up the fruits of his former victory on the shores of the Black Sea, nevertheless, on the whole his policy of expansion was successful. But his great work in R was the reform of the finances, the administration and the army and the founding of a navy. He introduced W. methods: he drilled his army on the W. model; he imitated many foreign institutions, disregarding entirely the prejudices of the people. When he died in 1725 the era of modern R had begun. He had planned at the beginning of his reign a great crusade against Turkey. The latter was the natural enemy of R; the Holy war the natural excuse, but he soon found that European politics did not allow of his interference with the Turk and so he gave up that plan. But he reform. Legacy of the whole of the Russian administration and though he tried to introduce W. ideas too quickly so that in many cases the customs of old R continued to exist under the veneer of a new civilisation, his reforms had lasting effect and R took her place as one of the great powers of Europe. All his reforms naturally did not please his people, who were by nature conservative, and this conservatism resulted in many of his administrative reforms proving unworkable in the hands of incompetent and predatory officials. He founded Peterburg at the mouth of the Neva, his window to Europe, and he proclaimed himself emperor of the Russians—a title which gave him place beside the ancient emperors of the Holy Roman Empire. Agriculture, mining and all other industries hitherto neglected were revived. Customs prevailing from the time of the old Mongolian rule were abandoned, the luxuries of the W. were introduced and above all the position of the women of R was much improved. But the cost to R was great and the chief victims of the financial burdens were once again the peasants. The standards of the upper classes rose but those of the peasantry were further depressed.

Peter left the throne to his second wife, Catherine I, but she, after a short reign, was succeeded by Peter II (1727-30), a grandson of the great Peter, but a feeble ruler. The nobles regained some of their power and R began to lapse into her old ways. On the death of Peter II, the crown was offered to Anne of Kurland, the niece of Peter the Great, who succeeded on certain conditions and who for a time gave up the autocratic constitution. Her administration was directed principally by her incompetent favourite Biren on the lines of a petty Ger. state. She

was succeeded (1740) by the infant Ivan VI, who, however, only held the title for a year, and was then succeeded by Elizabeth, a daughter of Peter the Great and Catherine I. The main characteristic of her reign was her hatred of Prussia and to this end she devoted many of her best troops and very large sums of money. Her administration carried on by her favourites was based upon the methods of Peter the Great, and was national in tone. She was succeeded in 1762 by her nephew Peter III, who had married a princess of Anhalt-Zerbst and who was assassinated within seven months by partisans of his wife, who then succeeded as Catherine II (*q.v.*) and ruled until 1796.

Catherine II was a typical despot of an age when benevolent despotism was held to be the highest form of government. Catherine had usurped the Russian throne, but she did more than any other ruler to consolidate and further the reforms of Peter the Great. If Peter the Great had introduced many of the customs and ideas of W. Europe into R, Catherine II went still further, and attempted to introduce the culture and civilisation of W. Europe. Immediate attention was paid to education. The philosophes of the French encyclopaedic school had great influence and Catherine herself called together a great council at Moscow which was to decide and formulate the various reforms to be introduced. The ideas of Catherine, however, frightened conservative Russians and the reforms had to be introduced by decree of the empress. Not only were great strides taken in education, but the administrative reforms also were very marked. The units of gov. set up by Peter the Great were still further split up. A certain degree of self-government was granted to some of the higher classes and many of the estates of the Church were taken over by the State. Serfdom, however, increased and was in fact extended into some parts of R where previously it had not been known. The administrative reforms did not stop, administrative corruption, the financial crisis increased and the attraction which a brilliant court offered to the nobility and gentry drew them away from their estates and cut them off from their peasantry. Catherine was in theory anxious to improve the condition of the peasants, but her policy only succeeded in increasing their burdens. The tone of the Russian court improved greatly and in fact was based upon the court of Versailles. But the reign was by no means peaceful. A pretender ravaged the border under the name of Peter III. This pretender had a great following and did considerable damage until finally defeated and executed. Catherine's foreign policy was devoted to pushing the frontiers of R southward and westward as far as possible. In this he prospered. She carried on wars successfully against Turkey, Persia, Poland and Sweden. She acquired the peninsula of the Crimea and thus accomplished Peter I's great aim of obtaining a footing on the Black Sea.

Also of great importance to R. was her participation in the partition of Poland, by which R. extended her boundaries greatly to the W. Encouraged by the success of this, she planned the conquest and partition of Turkey in much the same way. Catherine did all she could to combat the principles of the Fr. Revolution, although she took no active part in the coalition against France. She was probably awaiting an opportunity to attack Turkey and solve the questions of the Near E. whilst Europe was otherwise engaged when she died in 1796.

taken up with liberal reforms in which he himself took a great interest. The system of administration was again reorganised (educational schemes were discussed and the work of the emancipation of the serfs was begun, when Alexander's attention was drawn from internal reform to European politics. R. had for some time now claimed a position as one of the great powers of Europe. For a time in alliance with France, Alexander held a strong position in Europe, but he soon saw that the real strength of R. lay not in allying with France, but in preventing that power



W. L. Slonin

ALEXANDER I. PRESENTS TO NAPOLEON SOME KAIMUKS, COSSACKS, AND BASKERS OF THE RUSSIAN ARMY. JULY 1807.

From the painting by B. F. Portin in the Louvre.

Catherine II was succeeded by her son Paul I. who had been kept in captivity during the greater part of her reign, and who was capricious and arrogant and became extremely unpopular. His reign marks the beginning of an improvement in the condition of the peasants initiated by Paul, probably mainly to spite their owners. Catherine's countrymen whom he hated. He did not immediately join the European coalition against France, but did so in 1798 and almost immediately withdrew, having conceived a great admiration for Napoleon. He was on the verge of declaring war against Great Britain when he was assassinated. He was succeeded by his son Alexander I. (1801-25), who at the very outset of his reign earnestly desired peace, but whom European politics dragged into the vortex of war. The early part of his reign was

from becoming too powerful. The aggression of Napoleon in mid Europe caused Alexander to go to war, but the defeats at Austerlitz and later at Friedland led to the treaty of Tilsit. At the interview which preceded the drawing up of this treaty, Napoleon and Alexander agreed to divide a world empire between them. Napoleon, however, had no intention of keeping his word. The vague promises made to Alexander were all broken. The long-planned conquest of India came to nothing. Austria was crushed, Germany overwhelmed, Spain annexed. R. remained alone unconquered, and Napoleon now turned his attention to her. Between the years 1812 and 1813, Alexander was Napoleon's enemy, and the disastrous retreat from Moscow had probably more effect on the ultimate overthrow of France than anything else.

Russia after the Napoleonic Wars — After the treaty of Paris Alexander departed entirely from his previous scheme of liberal reform and became one of the champions of political reaction. By the time of his death it was beginning to breed those secret political societies which played such an important part in her later history. Alexander was succeeded by his brother Nicholas I, who made no pretence to any of the liberal sympathies of the late king. Autocratic government was at its height during this reign. Any attempts at revolution or at liberal reform which could only be obtained by revolution were crushed with great severity. Travelling and hence the importation of new ideas was made increasingly difficult, and this system was further aided by a strict censorship of the press. Progress, however, continued: the army was made efficient, the navy increased, commerce was fostered, and a good system of railways inaugurated. The work was carried out entirely under the auspices of the tsar and his personal gov. During the thirty years of his reign (1825-55) wars were fought with Turkey and with Persia, both of which obtained for R an increase of territory and in the former case an over-whelming superiority. The Black Sea. Nicholas was a strong believer in the divine origin of kingship. For this reason he supported the emperor of Austria when the Magyars rebelled and was never friendly with Louis Philippe, raised to the throne by the people. He made Poland into a Russian prov. and finally went to war with Turkey and found himself involved with England and France in the Crimean war. Although the Allies gained but little, the loss to R was tremendous, and in the middle of it all Nicholas I died.

One of the first acts of his son and successor Alexander II was to make peace by which he lost the right of navigation on the Danube and a strip of territory to the S. of the Black Sea and was no longer allowed to keep a navy in the Black Sea.

The early days of the reign were full of important liberal reforms. One of the most important of these was the creation of *zemstva* (roughly corresponding to local councils) in 1864. Their authority was limited; they took the decisions not the tsar, as the unit of gov. for a long time they existed only in the Russian provs., but they allowed some practice of the representative principle, and proved to be one of the most powerful of the constitutional organs of critical criticism. The *zemstva* (*zemstvos*) was a class in which constitutionalist liberals and conservatives were trained; it contained an idea which, if extended further, might have saved the Romanovs, but they were incapable of acquiring the necessary independence. Justice underwent complete reorganisation, seldom was a law passed and the reforms would probably have gone further had not a rebellion broken out in Poland and been crushed with a severity which restored more or less the autocratic system. Censorship was introduced in 1874. In 1868, as an immediate result of

the insurrection, Poland was incorporated entirely with the Russian Empire.

Seizing the opportunity offered by the Franco-Prussian war R in 1870 repudiated the clause of the peace of Paris (1856) which forbade her to keep a navy in the Black Sea, and the Conference of London upheld the repudiation. Meanwhile R had made extensive conquests in the E. and had established entirely the Caucasus and had established Russian supremacy over Turkistan. The frequent oppression of the Christians in Turkey and the suppression of an attempted rebellion by methods of barbarism, led to a conference of the powers whose overtures were rejected by the Turks and this in turn led to the declaration of war by R. When the Russians appeared to be on the point of entering Constantinople, the peace of San Stefano was signed (Jan. 1878). The powers, however, refused to recognise the terms of this treaty, and the early months of that year were passed in the fear of a general war. Finally a Congress was held at Berlin and the treaty of Berlin was signed (1878) by which the powers came to general agreement as to the arrangements of the states in the Balkans.

Nihilism in R was on the increase at this time and finally, in 1881, Alexander II was assassinated by a Nihilist agitator. He was succeeded by his second son, Alexander III, whose reign was characterised by reaction. Jews left the country in vast numbers owing to oppressive measures. Many villages were annexed in 1884. The statesman whose views ruled in this policy was Pobedonostsev, in his book, *Moscow Conversations* he stated his conviction that W. democracy was rotten, and that R could remain sound only by continuing her system of autarchical government. So when II succeeded his father in 1894 and at the beginning of his reign the Russian sphere of influence was extended in the Far E. the Manchurian railway was completed and Port Arthur seized. Conflicting interests between R and Japan led to the Russo-Japanese war (1904) in which the Russian force were defeated on land and sea and their fleet annihilated while in R it felt the govt. was paralysed. Peace was signed at Portsmouth, U.S.A. on Sept. 1905.

Obtaining, exceptionally, a *pacifist* terms.

Movements in R. The *Growth of Opposition Groups*. It was the increasing tension and mutual envy of Russian domestic policy between 1860 and 1876 which did much to encourage revolution. Repeatedly a few men of reform were followed by an intense reaction and once more were frequently cancelled in whole or in part within a short time of being granted. Thus the civil law of 1890 (establishing the land captain) was regarded by the peasants as a cruel re-imposition of old feudalistic oppression, might if applied effectively have suppressed revolution at least for a considerable period. A steady issue of conciliatory reform might, if not rendering all discontent, have prevented a final complete overthrow of the established system.

but the fluctuating policy which was instead pursued irritated the professional classes, the artisans and peasants, and the more intelligent of the landed gentry and aristocracy. The bourgeois and small landowners (who included some of the most enterprising of the peasants) were in the main the supporters of the Liberal and progressive (conservative groups such as the Cadets which began to take party shape in the last years of the nineteenth century). These groups accepted and supported tsarism, capitalism and private ownership of land etc. but wished for a parallel check on administration and for responsible civil government on British lines. In negotiating for an elected Duma they drew their inspiration from the British Parliament and their leaders visualised political reform on British lines. In the years preceding the revolution of 1917 these groups had support from the most influential interests in the country. They lost it gradually and the most idealist, desperate and ruthless turned to more extreme parties as it became clear that the Liberal and Conservative attempts to co-operate with the regime in order to reform it were unsuccessful. The tsarist administration could not be trusted to keep its word. Its disregard and contempt for the parties which might have been able to save it resulted in a loss of confidence in the European democracy and in the possibility of reform without revolution.

Socialist groups began to develop at the end of the century based on the teachings of Marx (4) but they remained comparatively unimportant until it was obvious that the Duma experiment was a failure. Their rise was initially favoured by that of industrialism in Russia. Mining development created a vast industrial area in the Donetz basin, munuf. spring up in the cities of St. Petersburg and Moscow and created new towns such as Yuzovka and Ivankovo. A proletariat was created who lived in first class exploited events which are those described in Gorky's *Diade*. It did not occur in fact. Between 1882 and 1886 a series of factory laws inspired by Bunge investigated these conditions but any reforms had to battle against the gov. reluctance to enforce the law and the corruption and corruptibility of the inspector. In 1887 Bunge was driven out of office charged with being a socialist and his reforms were abandoned. Nevertheless, factory conditions generally improved during the first decade of the twentieth century and wages rose. There were opportunities for a limited liberation in the time which awakened political interest among the workers. In 1898 the Workers' Social Democratic party was formed which after the 1900 congress split up into the Bolsheviks and the Mensheviks. Both these sections sent their members among the industrial population in a way which had been tried earlier by the less extreme groups but with less success. Bolsheviks and Mensheviks however, had the advantage of knowing exactly what they wanted, their belief in the dictatorship of

the proletariat was calculated to appeal to the class they addressed, and their uncompromising attitude attracted people exasperated by half concessions. When, owing to gov. obstinacy constitutionalism seemed a failure the Social Democratic party gained many supporters from the professional classes. Lenin was the son of a school inspector. Trotsky of a Jewish chemist.

The first Russian revolution (1905) showed that the Social Democratic party was able to command limited support in industrial areas enough to cause a temporary but significant demonstration. But the gov. was not yet dislocated enough by war (as it was in 1917) nor was support for the Social Democrats sufficient to make it anything more. Though caused by chronic discontent with prevailing conditions the demonstration was precipitated by the Russo-Japanese war and was tacitly supported by many Liberals and Conservatives. A general strike was called throughout Russia followed in Dec. 1905 by a military insurrection in Moscow. A Soviet (a council of elected delegates) of workers' deputies was formed in which Trotsky, then a Menshevik, was prominent. The Imperial Gov. under Witte capitulated (Oct. 30, 1905) promising reform of constitution and democratic franchise. In March 1906 elections were held for the Duma which opened on May 10 the Cadets being the strongest party. Revolutionaries and reactionaries had both been discredited, the Social Democrats which were under the leadership of Lenin had boycotted the elections until it was clear that all other parties were participating, they joined in to vote to make up lost ground. The address to the throne was inspired by the Cadets under the able leadership of Nabokov. It urged a gradual moderate programme of reform. The gov. pronounced this inadmissible and this resulted in moderation being abandoned. A violent vote of censure was passed. The Duma decided to publish an appeal to the country. But so it could do so (July) it was summarily dismissed. The Duma had conducted itself efficiently and moderately. Even though it had been goaded into violent criticism it had never been revolutionary. Cadets and Labour leaders went to Finland and appealed for a campaign of passive resistance to restore the Duma but this met with no response in Russia. As a concession to the Liberals Nicholas II appointed Stolypin as Prime Minister who instituted agrarian reforms aimed at encouraging the peasant proprietor. This was not popular with any section of the community. Stolypin claimed to be a constitutionalist and not a parliamentarian; he wanted a Duma which would give support to his acts. The gov. therefore did all it could to influence the elections for the second Duma which met in March 1907 and in the face of this the electioneers behaved in a remarkably alert fashion. The results showed how much Stolypin's dismissal of the first Duma had strengthened the extremists. The constitutionalists who had appealed

to the nation from Finland were debarred from this Duma and they were replaced by left wing groups. This time I can did not boycott the elections his party secured fifty four seats. The reactionaries set out to bring the Duma into disrepute and in June the Duma was dissolved owing to an alleged plot against the emperor (the result of deliberate police provocation) but in Nov. 1907 a change in the electoral law (involving in some of its provisions a definite breach of the amended fundamental laws and thus showing once again that the gov. would not keep its word) produced a third and strongly conservative Duma which continued until 1912. The Octobrists led by Guchkov had a majority in a freely elected Duma the Cadets would almost certainly have been in control. Their political eclipse was a major tragedy for R. their policy was sound and moderate their members contained idealists and practical men and they showed fine political sense in the Duma and organising ability in the *zemstva*. The Octobrist group was liberal in attitude and contained many notable individuals but it was less firmly welded together than the Cadets and was an association rather than a party. It now had much scope for individuality that it had no clearly defined policy. Its criticism of the gov. was telling but owing to lack of immaturity had less force than that of the Cadets. Gradually however the third Duma acquired political maturity and though it did not adequately represent the nation gained popularity in the country. It lived out its five year term and was successful in persuading the gov. to make several administrative reforms of varying importance. Had it had the power of the W. assemblies in which it was modelled it might have transformed R. The third Duma pursued the policy of testing satisfied with limited concessions in the hope of gradually achieving more but the fluctuations at court made this policy dangerous. To some extent therefore this Duma and its successor (1912) which resembled it in composition and temper was guilty of playing at parliamentarism in its position within its limits, was apparently so secure that it was tempted to lose its sense of urgency and became at times more like a debating society. Stolypin's position at court was meanwhile deteriorating and he was assassinated in 1911. Kokovtsev his reforming successor was dismissed in Jan. 1914 because he protested against Rasputin's (q.v.) influence at court. Though the permanent existence of a Duma now seemed assured it had not succeeded in gaining any legislative power. Moreover toleration of it had to some extent lessened its critical force and ardent reformers were being driven into the minority Social Revolutionary and Social Democratic parties which did not believe that real reform was possible without revolution. The fickleness and political stupidity of the court served to confirm this, and to accentuate the ineffective-ness of the Duma which at first (1905)

was practically elected by universal franchise. Constitutionalism was never really given a serious trial, its semblance merely served by its inherent incompleteness to discredit it. Internationally during this period R. was allying herself with France rather than with Germany, in the expectation of a loan and of the fear of R. was giving place to fear of Germany. An Anglo Russian treaty was signed in 1907 the signatories agreeing to respect the territorial integrity of Tibet and the suzerainty of China. Other conventions were signed (1910) between R. and Japan respecting the status of Manchuria and between R. and Germany (1911) respecting rights in Persia. The triple Entente between France and England was powerless to resist the Austrian annexation of Bosnia but an anti Austrian Slav movement was stimulated.

Russia after the Outbreak of War

After the Austrian ultimatum to Serbia on July 23 1914 R. championed Serbia and on July 29 a general Russian mobilisation was ordered but it did not equal one on the assurances of the German Emperor. On July 30 however a general mobilisation did take place and Germany declared war on R. on Aug. 1. The object of war was the liberation of the Slav peoples. Immediately Russian offensives were started in Poland and in Galicia. The German retreated beyond the Vistula R. but at Tannenberg, Aug. 31 1914 Hindenburg defeated Samsonov (see TANNENBERG). The Russian Army was driven out of Poland but was more successful against the Austrians, occupied Galicia and also prevented an Austro-German army under Hindenburg from taking Warsaw in Oct. This relieved the pressure on the Allies on the W. front but R. was living beyond her military means. In the spring of 1915 Germany having lost the battle of the Marne concentrated against Poland and Lithuania. Courland and the W. Russian prov. were occupied by the Central Powers.

The domestic situation in R. became complicated. To arouse patriotism and to avoid handing over the direction of the army to the Duma Nicholas II assumed the position of commander in chief. In the summer of 1916 the Russian military situation improved and Brusilov's (q.v.) offensive against Austria was successful. The Duma however regarded Nicholas as incapable of conducting the war vigorously and in this opinion France and England concurred. That it was isolated. Obvious gov. inefficiency was responsible for many of the military disasters increased the Duma's prestige. The progressive bloc became more powerful achieved real influence at court and in the gov. and seemed about to begin the evolution into a legislative chamber on W. lines when the intervention of the Tsarina whose ideas on government were of a reactionary, caused the dismissal of the more liberal members of the gov. The emperor's presence at the front made his wife and Rasputin (q.v.) the real rulers of R. Gov. corruption became blatant there was a particularly unsavoury Church scandal in Oct. 1915. Nicholas himself was

acclaimed when he visited the Duma in Feb. 1916, but earlier in the same month *Stürmer*, one of Rasputin's creatures, was made Prime Minister. In July Sazonov, a prominent reformer within the gov., was dismissed after evolving a just and moderate scheme for granting autonomous gov. to Poland. The efforts of the army were thus being undermined by corruption and incompetence at home. Signs of its affection grew among workers and soldiers, and the anti-war propaganda of Lenin's followers began to take root.

The Prelude to Revolution—November 1916–March 1917—After the stormy meeting of the Duma in Nov. 1916 the Russian political situation seemed to be settling down again with renewed triumph for the autocracy behind the throne. But under the surface there was a gradual stiffening of all the better elements in every grade of Russian society and a gradual coalition of these elements against the secret autocracy which governed the court and suppressed free opinion through the terrorism of the secret police. In Dec. 1916 Rasputin was murdered. On Dec. 29 Prince Yusupov, who was a young connection of the imperial house, Purishkevich (a Conservative member of the Duma) and the Grand Duke Dmitri Pavlovich after an unsuccessful attempt to poison Rasputin, shot him and threw his body into the Neva. The news of his death was greeted with national enthusiasm. The emperor however acted as pall bearer at his funeral. The Grand Duke Dmitri and Yusupov were exiled. The emperor's decisions were now absolute. The meeting of the Duma arranged for Jan. 25, 1917, was postponed for a month, and the general congress of the Union of Tsns and Zemstva (which existed for Red Cross work) was forbidden. The censorship was imposed with the utmost rigour; the secret police were greatly increased and machine guns urgently needed at the front, were mounted on the roofs of Petrograd. It is clear that Protopopov, who was now in the emperor's confidence, hoped to provoke a crisis which he would be able to crush and use as an excuse for negotiating a separate peace. On Feb. 9 without trial the labour group of Guchkov's war industry committee were imprisoned on a charge of conspiracy. The governmental chaos and irresponsibility, the war weariness, the dislocation caused in the army and police machine by the war and the exasperation of all sections of the pop. with the continual misgovernment, corruption and broken promises were welded together into revolution by the increasing famine in the country. The gov. could completely incompetent to deal with the grain shortage, and in Petrograd the bread ration seemed in Feb. likely to fail altogether.

The Revolution of March 1917—Outwardly public life seemed to be normal, but in the afternoon of March 3 there was some looting of bakers' shops in the poorer quarters, and a procession of students and workers' wives appeared in the Nevski Prospekt. On the 9th some

of the new-papers failed to appear. The food debate in progress in the Duma took a new turn and the gov. were appealed to to provide food for the cap. Cossack patrols fraternised with the people. There were scuffles between the crowds and the police. On the following day, Saturday, March 10, the trams ceased running and the workmen struck work. On Sunday Gen. Khabulov, the new military governor of Petrograd announced that demonstrators would be fired upon. During that day there was firing on the crowds, and some 200 people were killed. The Nevski Prospekt was put under military guard. A company of the Pavlovsk Regiment continued when told to fire on the people. The president of the Duma, Rodzinko, telegraphed to the emperor, who was at Gen. Russky's headquarters at Pskov, telling him that there was anarchy in the cap. and that the gov. was paralyzed. He appealed to the emperor to invest some one who enjoyed the confidence of the people with powers to form a new gov. On the same day the Duma had refused to be prorogued and had elected an emergency committee which continued to meet. Rodzinko announced that the Duma was now the only constitutional authority in it. On March 12 the Jacobinskii Guards refused to fire on the crowds in the streets and instead shot some of their own more unpopular officers. The Volynski Regiment was sent to deal with them but instead joined the mutineers. The united troops captured the arsenal and provided the revolutionaries with munitions. Other regiments joined the insurgents. In Petrograd all pretence of gov. had now gone except the Duma which dispatched a still more urgent telegram to the emperor. News was received that the emperor was bringing troops to suppress the revolt. In the afternoon the Duma chose a committee of twelve to form a provisional gov.

Meanwhile a committee of workers and social revolutionaries had been formed separately and they had now more influence with the people and the incoming troops than had the Duma. On March 14 the Duma Committee through two of its members, Tchadzev and Kersensky, got into touch with the Council of Labour, which had been organized to represent the more extreme revolutionaries.

On Wednesday, March 14, the first step of the revolution in Petrograd was practically over and the main question concerned the relations between the Duma Committee and the Council of Labour, which had now been given the title of Council of Workers' and Soldiers' Delegates called for short the *Soviet*. Power lay between the two, and it was becoming more difficult to keep the peace between their different adherents. Both sides issued large numbers of proclamations, one issued by the Duma Committee setting out a reasonable plan for the creation of responsible representative government. Meanwhile the emperor's position remained obscure. He had not been deposed, and had tried unsuccessfully to reach Petrograd on the 14th. On the 15th

he sent for Russky and signed a manifesto granting responsible government. There was at this stage no course for the tsar but to abdicate. Nicholas made no opposition. When he learned that his son's disease was incurable he abdicated in favour of his brother the Grand Duke Michael. Meanwhile however the position in Petrograd had grown more complicated. Most members of the Duma Committee wanted a constitutional monarchy, but the Soviet wanted a republic. On Thursday afternoon when the abdication of the emperor was still unknown, Miliukov announced in the Duma the names of the new ministers of the Provisional Gov. The gov. was a coalition of all the parties of the left and centre. Kerensky (q.v.) went to the Soviet meeting and persuaded its members that for the present the monarchy must remain. His appeal was successful and the Soviet passed a resolution giving conditional support of the Provisional Gov. by a large majority. The Soviet attempted to ensure the abrogation of military discipline. This the Provisional Gov. refused to do, but the order circulated in the army as though it came from the gov., and dissolution of morale the result. A deputation from the gov. called on the Grand Duke Michael and persuaded him to delegate all powers to the Provisional Gov. until the Constituent Assembly could be called. With the declaration which he thus issued the fall of the Romanov dynasty was complete.

The Provisional Gov. lacked a clear policy since it was composed of men of widely different points of view, and it failed to secure the support of the people because its members were mainly 'moderates' who had failed in their previous attacks on the autocrats and had tried without success to co-operate with the autocracy for the country's service. The leaders of the Soviet and the other hand had consistently preached revolution, and had never been credited with the autocrats. In a revolutionary period it was natural that those with extreme views should attract most support. The Provisional Gov. saw the need of attempting to stabilise the situation in R. and of first finishing the war and then making a constitution. The members of the gov. were men of honesty and patriotism and represented the best type of Russian administrator, but they lacked the popular appeal necessary in the leaders of a revolution. The extremists of the Soviet were representatives of the working people of the cap. To a lesser extent they represented the industrial workers of the whole country, but the industrial workers in R. were themselves a very small proportion of the total pop. The many millions of the peasants were entirely unrepresented in the councils of the Soviet. The rank and file of their supporters were completely ignorant on all questions of government, but their leaders stood for a complete reversal of the old system of government in R., and they combined an appeal to the class interest of the poor with an appeal to idealism. Their creed

was a kind of Socialism but not of the kind familiar to W. Europe. The development of socialist theory in R. in the generation before the revolution had been along two divergent lines, the one strongly influenced by the Russian Lavozy and the other with the Ger. Marx. From Lavozy's teaching there grew up the Social Revolutionary party, preaching a moderate Socialism which became prominent in R. about 1900. Kerensky was a representative member of this party. From the teaching of Marx which advocated the dictatorship of the proletariat, grew the Social Democratic party. Among the Russian industrial class at the date of the revolution the principles of Marxism were generally accepted. In 1907 the Social Democrats had split into two sections the Bolsheviks and the Mensheviks (see BOLSHEVISM). The conflict between the two was increased by their different views on the war. The former regarded it as merely a distraction from the true purpose of all workers, the revolution of the proletariat whilst the latter regarded Russian imperialism as the enemy and the allied cause as the cause of all workers. The Soviet of Workers' and Soldiers' Delegates represented both branches of the Social Democrats and contained also a few Social Revolutionaries. The majority of the council were anxious to bring the war to a successful conclusion, but Bolshevik leaders especially Lenin meanwhile were uninvolved in R. The pacifism and internationalism of the Bolsheviks found ready response in war-torn R. The Russian people had suffered intensify. In the army itself the Soviet found still more ready material. The Provisional Gov.'s power was being continually disputed by local Soviets springing up all over R., and the internationalist principles of the Bolshevik were accomplishing the break up of the empire into its innumerable component parts. There was no strong centralised power in R. What industrial organisation there had been was rapidly overthrown as the workers asserted their new found independence. Much of the land had already passed to the peasants as a result of the legislation at the beginning of the century. The old land-owning nobles and the century ruthless landowners had been expropriated by men deserting to return home to claim land. The peasants themselves came to have been interested in the political aspects of the revolution. They were a tainted but intelligent. They became so strong that later the Communist regime was forced at first in practice to recognise their possession of the land and claiming the right to its produce.

The greatest difficulty facing any constitutional form of government attempting to set its own feet upon the ground in the character of the Russian people with their infinite capacity for passive acceptance of events. Only an utterly ruthless tyranny could hope to drive them into action and in this quality lay the hope for the extremists who were prepared to stake everything on their chance. With the paralysis that fell upon the Russian

armies the frontiers were opened to German agents who became busy among the soldiers and workers. They represented to the people that Russia's Allies who were determined to compel R to continue fighting were her real enemies. It would be wrong to assume that all the men who accepted this propaganda were pro-Germans. They were international in their aims and willing to accept money from any one who would co-operate with them. Hostility began to grow up towards the Allies and particularly towards Britain. But meanwhile the Lvov Gov. secured some success. All the army commanders with the exception of Lvovs had accepted the revolution and with Alexeyev (71) in supreme command discipline began to improve early in April. On March 30 the gov. had issued a proclamation to the Poles guaranteeing their independence. The Petrograd Soviet seemed willing to co-operate with the gov. On April 9 Lvov issued a proclamation setting out the objects of the gov. and reiterating support for the war.

First Meeting of All Russian Congress of Soviets—On April 13 there was held the first meeting of the All Russian Congress of Soviets. The majority were in favour of the continuance of the war on their own terms. The minority, chiefly composed of the Bolsheviks led by Lenin (72) demanded an immediate cessation of hostilities since for them the enemy was the capitalist in all countries. On April 15 Austria made an offer of peace. The next move was the approval by the German, Austrian and Bulgarian Govs of a Socialist conference to be held at Stockholm by which it was hoped that the Russian delegates might be entangled into peace. Early in May it became clear that the Lvov Gov. was losing ground. The continual interference of the Soviets with military discipline was making the task of the commander increasingly difficult. In mid-May Guchkov and Milukov resigned. After a conference between the Provisional Gov. and the Soviets, a new gov. was formed including representatives of the left. Kerensky became minister of war.

The new coalition gov. issued a manifesto proclaiming their adherence to the allied cause. The Allies answered the manifesto cordially and sent missions to R to establish contact with the new regime. But the situation was confused. The commanders in the field were continually changing. Gourko who had replaced Schwartz with the central armies now resigned and was replaced by Denikin (73). On June 16 the second All Russian Congress of Soviets opened in Petrograd. Lenin bitterly attacked the coalition gov. The gov. held on the people was weak and extreme views in the Soviets were gaining ground. By the latter weeks of July the Russian troops had evacuated Kulish and were retreating all along the front while their armies in Galicia had become a disorderly mob.

The 'October' Revolution 1917—Meanwhile, the Bolsheviks in Petrograd under

Lenin and Trotsky and supported by mutinied sailors and soldiers were striving to usurp the gov. Kerensky's vanity gave the opening for the Bolsheviks. Their military genius was Trotsky (74) who had become president of the Petrograd Soviet and now prepared a sort of general staff, called the Military Revolutionary Committee which organised the Bolshevik elements in the army and navy and in industry. On Nov. 3 this committee ordered the Petrograd garrison to place itself under their instructions. Kerensky summoned the loyal troops to defend the gov. On the 7th Lenin arrived and the Bolsheviks made their headquarters at the Smolny Institute from which they issued a proclamation announcing the fall of the gov. and the transfer of power to the Soviets. The majority of the regiments went over to Trotsky and early on the morning of the 7th Kerensky fled. In the evening at a meeting of the Petrograd Soviet Lenin and Trotsky announced the success of the new revolution and next day an All Russian Congress of the Soviets placed the gov. in the hands of a body called the Council of People's Commissars, with Lenin as president, Trotsky minister of foreign affairs and Kuybyshev (75) as commander in chief of the remnants of the army. The new gov. proceeded to confiscate all land not belonging to the proletariat. On the 28th the German ultimatum in the 1 agreed to negotiate for an armistice. Though the date accepted as the beginning of the Bolshevik Revolution was according to Western European and Soviet calendars Nov. 7 the Old Orthodox calendar was still in use in R at the time. The date old style therefore was Oct. 25. The name October Revolution was retained after the calendar was changed. The Bolsheviks were now firmly in the saddle but speedy action was essential in order to secure their position. They began by enlisting large numbers of Red Guards and founded their gov. frankly on force. Their main programme of the class war was embodied in the famous appeal of Karl Marx. Workers of the world, unite, you have a world to win and nothing to lose but your chains. The Bolsheviks were far from being anarchists since they aimed at a rigid system of government by compulsion and true anarchists became their opponents just as much as did the monarchists and the reactionaries. The true Bolsheviks were a tiny fraction of the whole people but almost alone at this time in R they knew exactly what they wanted and they set out with determination to achieve their ends. Their teaching had led them to think that Marxism would not come into power first in R which had not yet gone through a period of capitalism as Western Europe had and their leaders arrived in R after the outbreak of the revolution. But the amazing energy and ability of Lenin and Trotsky enabled them to turn Kerensky's victory into their own. They showed great skill in gaining hold of every department of importance and in adding power during

the first years of their government. Their core of strength was among the artisans, especially in Petrograd, and on this basis they managed to establish control of a country in which industrial workers were very few. With the threat of force the Constituent Assembly, where the Bolsheviks were in a minority, was dispersed on Jan. 18, 1918. Their first object was to stop the war. Having brought about the disintegration of the Russian Army, they directed their propaganda at the masses behind all the other armies with the object of spreading the 'dictatorship of the proletariat' to all countries. In 1917 the Soviet Gov. faced with

Bolsheviks did not intend to continue the fight against Germany. England ended negotiations and set up a Social Revolutionary Gov. in Archangel and Murmansk. The imperial family were murdered at Ekaterinburg on July 16-17, a week before the Czechs occupied the place. Adm. Kolchak received allied support for the establishment of an I. front in Siberia. He set up a dictatorship and advanced almost to the Volga. Denikin headed the S. anti-Red forces. All these efforts failed. The Bolshevik Party was united round Lenin by the danger and the general rule of force enabled them to maintain an absolute dictatorship aided by ruthless



LENIN ADDRESSING A MEETING

of cultures

anti-Bolshevik volunteer armies with resistance from the Cossaks, and with a separatist movement in the Ukraine, ceased hostilities against Germany. On Jan. 28, 1918, the Ukraine proclaimed independence, but was occupied by the Soviet Army, which in turn was driven out by the Germans. It accepted peace terms, and on March 3 signed the treaty of Brest-Litovsk (*q.v.*).

History of Russia after the First World War, 1918-30—The allied powers, with the war against Germany still undecided, sought to build up a new I. front and to this end abandoned the Bolsheviks in favour of various anti-Red groups. Kornilov and Alexeyev operated in the S., and Chernov established a Social Revolutionary group on the lower Volga. Siberia set up an autonomous gov. and in Manchuria, Vladivostok and Transbaikalia other opponents arose. Particularly remarkable were the exploits of the Czech Legion, who took control of the Trans-Siberian railway. When it became clear that the

terrorists Trotsky and others showed great powers of initiative and organisation. But in addition new men appeared from the lower ranks of the army and elsewhere, and such leaders as Budennyi, Frunze and Chapayev demonstrated their initiative and ability for the type of warfare required. Moreover there was a socialist front from a peasantry who at last had gained possession of the land and were inclined to lose it again with the restoration of the old order. Amongst the anti-Red groups confusion and weakness were everywhere apparent. With the collapse of Germany the Allies lost interest and successively abandoned their protégées. Bolshevik propaganda was effective both abroad and amongst their Russian opponents. In May and June 1919, Kolchak failed to gain direct recognition, was driven back and finally shot on Feb. 7, 1920. The Brit. under Lord Rowland (*q.v.*) evacuated Archangel and Murmansk, shortly afterwards Denikin was defeated and succeeded by Wrangel, who

was eventually forced out of R on Nov 1920.

In the last months of 1918 popular risings in Germany and Austria's Polish provinces restored power to native hands and Pilsudski (*q.v.*) emerging from internment took over the reigns of government and declared a new Polish republic. Polish frontiers however had been left undisturbed and soon afterwards the Poles led by Pilsudski went to war with R. In 1919 what was called the Curzon line was drawn up by the Brit. delegation to the peace conference and suggested as an enduring frontier but neither R nor Poland accepted it. The Poles succeeded in reaching Kiev but were driven back to Warsaw. Later however with the aid of the Ir. general Weygand they drove the Red Army back. This defeat of the Russians led to the treaty of Riga (March 18 1921) which imposed a new frontier much more favourable to the Poles and corresponding roughly to that in existence before the partition of 1791.

New Economic Policy and the Five Year Plans—The civil war immediately following the Bolshevik seizure of power in 1917 had practically stopped productive work. The attempt to apply the principles of Communism to agriculture was bitterly resisted by the bourgeois peasantry or *kulaks* (*q.v.*) who 'struck' by simply failing to produce more than enough for their own needs. This brought famine to the tens. Trade in these conditions disappeared. Under stress of these conditions Lenin had to beat an economic retreat and in early 1921 evolved the N.E.P. The peasant farmer was allowed once more to trade freely in his grain selling either to a private merchant or to some gov. body. A few factories were leased to foreign companies and many smaller ones to co-operative groups of workers. Communist practice and the fantastic experiments of 1917 were thus abandoned though key positions such as control of trade prices and political power were maintained.

Though continuing to threaten the capitalist world the gov. sought its aid and a commercial treaty was signed with England in 1921 and trade missions exchanged with most European countries by 1924 in which year England, France and Italy recognised the Soviet Gov. A growing Russo-Ger. rapprochement was signified by the treaty of Rapallo of 1922. Inside R the extreme discarded an attack on all forms of religious worship between 1921 and 1923 but on the other hand a striking success was achieved in the introduction and development of primary education in a country with a very high proportion of illiteracy. There was a rapid recovery under the N.E.P. but it was along the lines of a return to the former economy and the peasants were for the time being victorious over the gov. R remained however poor and backward in the sense that it had too little industry and methods of farming too primitive to give the people more than a very low standard of life. The only

way to overcome this poverty and backwardness was to build more factories, to multiply the number of power stations, to mine more coal and metal ore. Already in 1920 Lenin had procured engineers to formulate a great electrification plan for the whole of R and great rivers like the Dnieper and the Volga were dammed and in other places power stations were built near coal and iron. By 1928 the country was producing two and a half times as much electricity as in its first days but this was still inadequate.

The N.E.P. gave rise to a type of economic adventurer. Sincere Communists alarmed by this and by the whole compromise policy prevailed in 1923. Purges in the party and amongst the new bourgeoisie were six times affected.

On Lenin's death on Jan. 21 1924 power was achieved by a triumvirate of Stalin, Kamenev and Zinoviev. The ruling power was Stalin who had profited greatly from his appointment in 1922 to the post of secretary of the party. Between him and Trotsky discussion soon developed partly as a conflict of character and temperament but also as one of policies. Trotsky still preaching 'permanent revolution' and the impossibility of establishing Communism in R without a world success. Stalin standing for a policy of Socialism in one country. Stalin gradually acquired the ascendancy until finally his rival was expelled in 1929. Kamenev and Zinoviev who had also fallen were reinstated after recanting their views. Stalin now put forward the policy that agriculture must be socialised if Socialism was to be a reality and carried it against the opposition of his recent allies of the right. Rykov, Bukharin and Tomsky were defeated and Stalin became supreme. From about 1929 the policies of R became those of Stalin. He introduced his five year plans for the industrialisation of R both to raise the standard of living and for the defence of the country.

The first plan dealt with electricity the whole of industry transport and agriculture. Its intention was to cover the land with power stations and with new factories of every kind to build new railways and roads to open up new mines to start entirely new industries to produce things like motor cars aeroplanes and synthetic rubber. This plan gave special attention to heavy industry of blast and steel furnaces and new engineering plants. And to pay for the import of turbines electric transformers and scientific instruments and machine tools the other products of Russian factories including textiles had to be exported in return. Notwithstanding the great domestic demand under the first five year plan enormous new plants were projected and new ones spring up. Huge tractor works were built at Kharkov automobile factories in Moscow and Gorky tractor plants in Rostov on Don and Stalingrad steel furnaces in the Donbas, fertiliser works in the Urals and enormous dams like that of Zaporozhe. This period (1928-32) was characterised by alternate

ruthless purges and conciliation policies for all of which Stalin was extolled because his plan was producing results. A new R of administrators and technicians was created and many characteristics of the country and its people were altered. After the first five-year plan came a second and by the end of the second at the end of 1937 Soviet industry had been so developed that the output of coal, steel and cement had quadrupled, that of oil, iron and paper had tripled, while new railways had been built, existing lines doubled, trucked, and some systems electrified. By 1938 R had become the largest producer of tractors and railways in the world. After the second five-year plan yet a third was launched to complete the work of construction that the preceding two plans had begun, but this third plan had run only three years of its course when the Gers launched their attack on R in June 1941. Great destruction was caused, amongst the many fine new towns and buildings and factories and power stations that the Russian people had built at the cost of so much effort and sacrifice. For the execution of these plans demanded great courage and extreme ruthlessness and a general sacrifice of personal needs in the expectation of future benefits.

Simultaneously with the first five-year plan Stalin launched the enormous task of the socialisation of agriculture against the deep instincts of the peasantry. The programme of collectivisation and mechanisation of agriculture was ruthlessly carried out. Thousands of *kulaks* were liquidated. The industrial plan and the workers and indeed the government were alike dependent on agriculture for both food and the revenue for the creation and perfection of the industrial plants. The results of the first importances and the growth of tremendous cost of life won. So Ferdinand Pearce put the cost at a conservative estimate of 5,000,000 lives. A new attack on religion was launched in early 1929 but even in 1937 it was admitted that half the population believed. Communism was also compulsorily introduced into the education system and many fine scholars were imprisoned or exiled. Longues within the party were frequent.

In 1928-33 however, in slackening by an apparent policy because of the necessity to unite the country in face of the growing threat from Germany with the rise of Hitler to power. Concessions were made to the peasants by allowing them to own private property and a larger share in the management of co-operative *collets*. In out-growth of the compulsion in industry and the Stakhanovite piece-work system was introduced whereby workers' earnings increased along with productivity. The family was raised to a position of honour, education became less violently Communist and the historical achievement of the old R were emphasised.

By 1936 the many great achievements had become a source of general pride and the basic principles of Communism secured

firmly rooted in the nation. In May of that year the new Stalin constitution was introduced (*see under CONSTITUTION AND GOVERNMENT*). Stalin was broadening his control of the nation and called for 'non-party Bolsheviks' under the slogan of 'the Union of Party and non-Party'.

Russia seeks Foreign Allies. Lithuania's Peace Front. The years of civil war and foreign intervention had deeply impressed themselves on the memory of the Russian people who always feared that these attacks would be repeated. They knew that their Communist social system was feared in other countries who tried to set up a *cordón sanitaire*. Russian policy sought alliance or closer diplomatic agreements with any country which manifested any willingness to reciprocate these overtures. During the 1920s the two countries whose chief threat R chiefly feared were Britain and France. Hence she declined membership of the League of Nations because she deemed that body to be dominated by those two nations, yet trade agreements were concluded with both countries. But at this period it was with the superficially democratic Germany and Mustafa Kemal's progressive Turkey that R had a much closer understanding, as evidenced by the treaty of Rapallo (1922) and the treaty of Friendship and Neutrality (1925) with Germany and Turkey respectively. Also in 1921 she resumed diplomatic relations with China to counteract the aggressive power of Japan who still coveted Siberia. But with the advent of Hitler to power in Germany R realised that the age-old German dream of the *Danubian Osten* was revived. Hitler indeed did not conceal his ambition to seek *Lebensraum* eastward first at the expense of Czechoslovakia and later into the Russian Ukraine and he began the devious policy of playing for the friendship or at least neutrality of France and Britain on condition that the two countries allowed him to pursue his policy of seizing territory in the East while not menacing France and Britain or their overseas empires. At this time Japan had begun her career of aggression in Manchuria and the five *Nippons* of China and R now feared the possibility of attack on two fronts simultaneously, especially as Germany and Japan had now joined hands with Italy in their anti-Communist Pact (*q.v.*) directed against the Soviet Republics. R saw that it was a war race against time until she could strengthen her position by building up an efficient armament industry so as to equip her forces with modern tanks, planes and gun-ammunition of withstanding the weight of the Axis (*q.v.*) force. It was partly to that end that R had embarked on her five-year plans with all their attendant difficulties and suffering. In 1921 Litvinov, Soviet foreign minister, supported proposals for all-round disarmament at the Geneva Conference (*q.v.*) and concluded a series of non-aggression pacts with most of the countries bordering on R. The Soviet Gov. now made two offers of neutrality agreements with Germany in

1934 but Germany rejected both. In Sept 1934 R joined the League of Nations from which both Germany and Italy had just seceded and the following year concluded treaties of mutual assistance with France and with Czechoslovakia. In 1933 however R was not invited to the Stresa Conference. It vainly constantly strove for an equal counter-part to the Locarno Pact and he called for strong 'sanctions' against Italy during the Ethiopian invasion and attacked weakness of the League when Germany reoccupied the Rhineland. During the civil war in Spain R endeavoured to counter the Brit and Fr policy of non-intervention and the dispatch of Ger and It troops to aid Franco by herself sending troops to aid the republicans. The capitalist countries saw in this move the revival of R's old policy of proselytising other countries to her own Communist ideology rather than a quest for ally. With the defeat of republic in Spain her intervention merely served to accentuate her isolation.

Treason Trials and Purges. In 1934 however Stalin's policy took a turn which much damaged R's reputation abroad. On Dec 1 1934 Kirov one of Stalin's favourite lieutenants was assassinated and in retaliation over one hundred members of the old Bolshevik party were shot. There followed a highly publicised series of trials and executions. Kamenev, Zinoviev and fourteen others were tried in Aug 1936 found guilty and shot on charges of planning the assassination of Stalin and others. In Jan 1937 there were seventeen defendants including half a dozen prominent leaders such as Pratakov, Sokolnikov and Radek accused of trying to sabotage the work of reconstruction on the instructions of Trotsky (who was assassinated in Mexico in 1940). All the defendants were adjudged guilty. Pyaytakov, Muralov and Serebryakov and eleven others were shot as organisers of the crimes. Tudek and Sokolnikov were sentenced to ten years imprisonment.

There was a greater crisis when the purge involved the Red Army nearly five months later. Marshal Tukhachevsky regarded as R's foremost general at that time and six other generals were shot on June 12 1937 though it was only during the Bukharin trial held in March 1938 that specific charges were made for the first time against the Red Army implicating some of its leaders in fifth column activities. The generals were court-martialed and there was no public report. The Ger and Russian Staffs had conferred together during the Rapallo period and it is probable that contact was continued after Hitler came to power and possible that there was some sort of plot the executions caused dismay in Germany.

In March 1938 Bukharin and Rykov were amongst the twenty-one accused. Nearly all of those tried in public admitted to plots against Stalin's life, contact with Ger and Jap agents was alleged on some extremely doubtful evidence and was denied by Bukharin. The conduct of

the trials in which no documents were submitted and no outside evidence adduced was much criticised abroad. The startling confessions of many of the accused may well have been motivated by a desire to make one last service to the party and its infallibility by men whose whole life had been and was bound up in the party and to whom life in opposition to it was unthinkable. The trials were only the more public part of a vast purge directed against any possible opponents of the Stalin group whose real enemies were the old champions of world revolution. In addition there may be some truth in the plea that the purge broke up a potential fifth column. It was widespread throughout the whole of R the party, the army, the bureaucracy and the people at large. The number of victims is unknown. The party was now solely the party of Stalin.

The Approach to War. In the outside world war was approaching the international Communist Pact was concluded in 1934, in 1937 the Jap began the conquest of China, in 1938 Hitler seized Austria almost completely encircling Czechoslovakia. R's ally France and Britain determined to avoid war at any cost to the Czechs carried through the Munich Agreement ignoring R. In the spring of 1939 Molotov replaced Litvinov the advocate of co-operation with the West. Following the Ger annexation of Czechoslovakia in March 1939 there were six months of negotiation between London Paris and Moscow. Chamberlain on Britain's behalf guaranteed the frontiers of Poland against attack. R asked for a similar guarantee of the three small Baltic states because she feared that the Gers would occupy them for use as a springboard in an attack on her. It is generally understood too that R wanted unity of command between the nations allied against Hitler and the right to send Russian troops forward on to Polish soil if Germany attacked. But these conditions were rejected and the negotiations dragged fruitlessly on through the summer. Simultaneously R was negotiating with Germany from April 1939 motivated by suspicion of Brit and Fr intentions and by a desire if possible to pre-empt for some time the Ger attack which they probably expected sooner or later. Polish objections to Russian entry of their country in support were eventually overcome but Molotov broke off negotiations and announced on Aug 23 the imminent conclusion of a non-aggression pact with Germany. Poland was secretly divided. Russian interests were acknowledged in Finland and in the Baltic states. The references to SE Europe were left so vague in the secret protocol that they were later to cause trouble between the two parties. Neither side regarded the pact as a true alliance. Some deliveries of food and oil were made by R but defensive preparations and military production were developed.

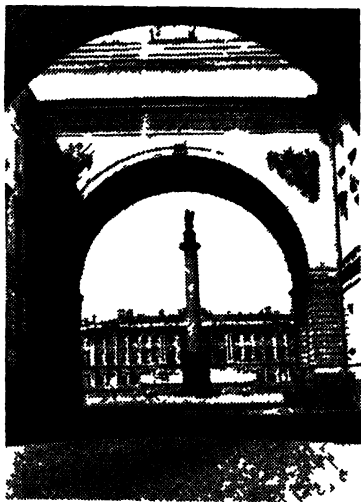
In July 1940 following the defeat of France and the Low Countries and the entry of Italy into the war R's position

was clearly weaker. Hence Molotov's reiteration before the Supreme Council in Moscow of Soviet neutrality and his emphasis on 'the importance of the existence of the Soviet-German non-aggression pact and its further development'. He wanted to induce the world to believe that these Russo-Ger relations were founded upon the fundamental interests of the two parties. The world adopted no such interpretation and nine months later the hollowness of such contention was only too obvious. It is unlikely that the Russian Gov. which was taking no chances, really believed in them for a moment for in Jan 1941 the head of the State Planning Commission to Moscow announced that R must make every effort to increase production of tanks, aircraft and warships in order to keep the country in a state of readiness for any eventuality. This announcement came immediately after Berlin's announcement of Jan 10 1941 of the signing of the so-called Russo-Ger Pact of Friendship apparently designed mainly by German cunning in the hope of ending rumours of deterioration of relations between the two countries.

When Poland collapsed in September 1939 and there was talk of the country being completely overrun by the Gers, Russian troops marched into the I put up to the Is Bug and San. In the following two months the U.S.S.R made pacts of mutual assistance with Estonia, Latvia and Lithuania. Preparations were made for Russian garrisons to occupy certain naval bases at the entrance of the gulf which forms the approach to Leningrad and Kronstadt. In the summer of 1940 the three republics were annexed to the U.S.S.R. But P's greater concern was over the Finnish frontier only 20 m distant from Leningrad. In the winter of 1939-40 the Russian Gov. made proposals to Finland for a revision of the frontier N. of Leningrad and for the lease of the promontory of Hangö as a naval base. Finland rejected these proposals and R declared war. At the end of three months Russian troops after many remarkable defeats broke through the Mannerheim line and occupied Vimpuri (see under FINLAND Finnish Russian War, 1939-40). The war was ended by a treaty which recognised Finland's independence but stipulated for a revision of the frontier N. of Leningrad to satisfy the Russian desire for greater security in the approaches to Leningrad. R anticipated Germany in Rumania by obtaining Bessarabia and the Ukrainian areas of the Bukovina in June 1940. An official protest was made to Hungary when Ger troops arrived on the Black Sea coast and to Bulgaria when that country joined the Ger. New Order in March 1941. The anti-Ger Yugoslav Gov. was given a pact of friendship but too late for any practical result. On March 21 Turkey was given an assurance of Russian friendship. In Iraq however the pro-Ger Rashid Ali (see under IRAQ) was recognised. In Sept 1940 the Ger-It-Jap pact of Axis countries became an alliance but on April 13

1941 a pact of neutrality was signed at Moscow between Matsuoaka (Jap) and Molotov. Molotov visited Berlin in late 1940 and the economic treaty was somewhat patched up with new promises. In Jan 1941 R seemed prepared to agree to a pact with the Axis but her proposed conditions never received a direct answer and the Ger occupation of Bulgaria followed is a pointer to the future. Stalin became Premier of the Soviet Gov for the first time in May 1941.

The Second World War. In the early hours of June 22 1941 without a formal declaration of war Hitler launched his ill advised attack across the Russian



SOVIET II

LININGRAD THE DVORTSOVAYA SQUARE AND THE ALEXANDRA COLUMN

The Winter Palace can be seen through the Kremlin Arch

frontier. The endeavour to damp the ardour of the W. allies by the reiterated insistence on the mixture of Communism and the Jews consistently haracterised the propaganda of Goebbels. On the evening of the very day when Hitler launched his offensive Mr. Churchill made a broadcast promising what would Britain would give to R. A few weeks later a treaty of alliance between Ger and Britain and the U.S.S.R. was signed. Thenceforth the war became a united front of the peoples standing for freedom against enslavement by Hitler's armies (Stalin, July 3 1941). The Ger invasion had a remarkable effect in awakening to full force the national consciousness of the Russian people. As Napoleon's invasion had done more than a century earlier. Indeed patriotism and interest in their own hist had for some years past been inculcated by the Soviet

Gov. and the war served to give a tremendous impulse to this process. Mr Churchill's offer of assistance was accepted at once by Stalin. A similar *rapprochement* took place with the U.S.A. and Litvinov, the persistent advocate of Russian co-operation with the W. democracies, who had fallen into disfavour on that account in 1939 was now appointed ambassador to the U.S.A.

The Ger. High Command endeavoured in the summer of 1941 to overwhelm by *Blitzkrieg* strategy. The Ger. armies soon penetrated the Ukraine, crossed the Dnieper, took Kharkov and Kiev, closely invested Leningrad, and advanced almost to the suburbs of Moscow. But the great Ger. attacks on Leningrad (*qv*) and Moscow were fought to a standstill, the celebrated Russian marshal Zhukov emerging as the saviour of the city. In the abnormally bitter winter of 1941-42 the Ger. armies ceaselessly battered by the Red Army and attacked by partisans, and not to utter disaster but after their commander von Kluge had been superseded by von Rundstedt (*qv*) they were extricated from their predicament though only at enormous cost. As a result of this strain the Ger. had to postpone their projected spring offensive until the summer of 1942. In this they were forestalled by the Red Army which launched an offensive round Kharkov designed to disrupt the Ger. preparations. As yet, however, the Russians were not equipped for any major operation going beyond a strictly defensive strategy, and their situation was serious in view of the loss of the Ukraine and of its industrial resources though fortunately as a result of the five-year plans their resources in the Ural region were considerable and more over great quantities of plant in the Donbas had been evacuated by heroic exertions further to the E. The Russian Command was aware that the Ger. were preparing another crushing blow, a double attack comprising a lightning advance into the Caucasus to secure oil and a lunge across the Don to the Volga to outflank the armies defending Moscow, and then by a northward lunge to surround Moscow and cut the Red Army in two. They were the more emboldened to this great military gamble because there was still no resumption of any campaign on the W. front or as it was not opening a second front. The impetus of the vast weight of the Ger. armour disorganised the Ger. units the Donetz and the Don into the N. fl. corridors of the Krim and the N. Caucasus and almost to the oil fields of Mukop and Grozny. In the Crimea however they only took Sevastopol after virtually destroying the city by huge siege guns, a delay which greatly compromised their timetable. They were halted similarly at the Volga by the amazingly heroic defence of Stalingrad, a battle which marked the real turning point in the campaigns of the E. front. The end of Nov. saw the Russians counter-attacking both to the N. and S. of the city driving the Ger. back and enveloping nearly 300,000 of

them in a remorseless trap, while the defenders of Stalingrad itself eventually flung the Ger. out street by street from the ruined suburbs.

Two main factors in the defeat of Ger. *blitzkrieg* methods were the Russian defence in depth and the scorched earth policy. The latter idea was not new in Russian hist. and it is significant that as early as 1917 organisations for civilian defence were being developed by the military authorities concurrently with their efforts to promote the military defence against air attack and chemical warfare. The Russian organisation which was functioning so effectively in the autumn of 1941 and later was undoubtedly the outgrowth of these preparations. Fought in 1911 and in 1912 by men who fought tenaciously for their homelands, the Ger. now resorted to brutalities unparalleled since the Dark Ages. In Khukov alone 15,000 civilians were murdered in March 1942, 7000 were machine-gunned in one day, then and were slaughtered in Leningrad in batches of a hundred by automatic weapons. These outrages were not of the class of occasional atrocities inseparable from war, they were an integral part of a systematic war of extermination planned by the Ger. High Command. But the Ger. underestimated the qualities of the Russian people. In the first twelve months of what Mr Churchill aptly called the Russian story they showed themselves to be allies of which the W. democracies might well be proud and from whom they could learn many valuable lessons in the art of war.

On May 26, 1942, the alliance between Britain and R. was extended into a treaty of alliance and mutual assistance to last for twenty years in peace and war. It provided for mutual support of all kinds during the war and for 'common action to preserve peace and resist aggression in the post-war period and for close collaboration after the re-establishment of peace in the organisation of security and economic prosperity in Europe. At the same time a full understanding was reached with regard to the urgent task of creating a second front in Europe in 1942. That front however was not opened until mid-1944 but a premature opening would only have risked further defeat. At the beginning of Aug. 1942 the military situation was already looking very serious for Russia and Russians and Communists and all were expressing chagrin over the first and American delay in attacking in the W. Hence Mr Churchill himself went to Moscow to explain what had actually been planned in relation to the invasion of N. Africa and Italy. His visit produced a substantial advance in the coordination of the efforts of the allied forces. At the time of the alliance of May 26, R. and America concluded an agreement providing for extended lend-lease (*qv*) assistance to R. and mutual collaboration after the war in the spirit of the Atlantic Charter (*qv*). In May of the next year the Communist International was dissolved. In view of the continued delay due to military considera-

tions in opening the W. front President Roosevelt and Mr. Churchill met Marshal Stalin at Tcheran late in the year. At this important conference military plans were fully coordinated.

In 1913 the Russians began the great series of counter-offensives which resulted in the overturning of the great industrial region of the Donetz basin and the recapture of Kiev, Kharkov, and Khostov on Don. These victories were soon followed by the relief of Leningrad, the retaking of ruined Sevastopol, and the Ger. debacle in the Crimea. The succeeding year was characterised by further great Russian advances, notably into White Russia involving the loss to the Ger. of Minsk, Vilna, and all the great bastions from Kaunas and Brest Litovsk to Przemyśl. Within the same period Finland was invaded by the Red Army and forced to sue for an armistice, and the same tide bore Rumani. From the Baltic to the Tiber the great and well-equipped Russian army groups were everywhere triumphant, apart from a decided if temporary check outside Warsaw. Before the close of 1944 they had won decisive victories in the Baltic states, which put them in possession of almost the whole of Estonia, Latvia, and a great part of Lithuania, and they had seized the greater part of Hungary and encircled Budapest. Throughout the late summer and autumn of 1944 and the winter of 1945, while the Anglo-American were advancing to the Rhine, the Russians maintained a huge offensive, reached Warsaw, put Rumania and Bulgaria out of the war and conquered all but a little of Hungary, inflicting enormous losses on the Wehrmacht. The turn of the year brought still greater success, victories under which the whole Reich reeled. The Russian capture of the indispensable arsenals of Silesia and of Cracow in Pomerania itself, and the outposts of Berlin and Saxony combined with the drive of the W. Allies made the end of the Berlin was encircled on April 25 the W. Allies closing in from the W. The city fell to the Russians on May 2 and the war ended a few days later (see EASTERN FRONT OR RUSSO-GERMAN CAMPAIGNS IN SECOND WORLD WAR).

Russian Relations with Japan. That it was mindful of her land boundaries as of her W. is shown by her decision taken at the Potsdam meeting of the Allies (July 26, 1945) to attack Japan, and indeed the denunciation of the Russo-Jap neutrality pact (on April 20) by R. was a warning to Japan that R. had the intention of seizing the most favourable opportunity of reversing the defeat of forty years back when Port Arthur and Sakhalin were lost (1904). Later in 1918-22, Japan taking advantage of the hostility of the W. nations to the new Soviet regime again attacked and plundering the Soviet Far E. Finally in 1938 Japan invaded Soviet Asia in the Lake Khasan area near Vladivostok, and the next year attacked in the area of the Mongolian People's Republic with the aim of cutting the Siberian trunk railway

and so securing the Far E. from Soviet R. On Aug. 8, 1945, R. declared war on Japan, who was then at the lowest point of her fortunes in the war. In a fortnight the Russian forces of Marshals Vassilevsky and Malinovsky had completely defeated the Jap armies and overrun Manchuria and, as a result of this victory, Sakhalin and the Kuriles passed to R. See also PACIFIC CAMPAIGNS IN THE SECOND WORLD WAR.

Polish-Russian relations in the course of the war always difficult were exacerbated by the pub. through a Ger. press agency of a report by the occupying military authorities that near Smolensk they had discovered a common grave with the bodies of more than 3000 officers who it was said, were murdered by the Russian security police early in 1940. The Poles fell into this Ger. trap and invited the International Red Cross to investigate an affront to R. which led to the Soviet Gov. breaking off diplomatic relations with the Polish Gov. in London. After the Russian conquest of Poland in 1944 to the frontiers of that country were once again the subject of a Russo-Polish crisis, which threatened to divide opinion seriously in Britain and in the U.S.A. against Soviet contentions. The Brit. Gov. had throughout the war recognised the Polish Gov. in London as the *de facto* if not the *de jure* gov. but the Russian Gov. suggested a committee that was formed at L. in soon after the Soviet forces had entered the city and this committee was installed in Warsaw as the Provisional Gov. It was the result of the discussions at the Crimean Conference held at Yalta in Feb. 1945, between Mr. Churchill, President Roosevelt and Marshal Stalin it was agreed that the Provisional Gov. should be recognised on a broader basis with the inclusion of democratic leaders from Poland itself and from Poles abroad and that the new Polish Provisional Gov. of National Unity should be pledged to hold free elections as soon as possible. The three heads of allied gov. also agreed that the Eastern front of L. and should follow the Curzon line with alterations from it in some regions of 20-30 kilometres in favour of Poland. They recognised that Poland must receive substantial concessions of territory in the S. and W. but that the final adjustments of the W. frontier must await the peace conference.

Results of the War in Russia. The material cost of victory to R. was heavy in the extreme even though on the moral side the war had given the nation new strength, a far greater esteem in the world and internally a stronger sense of solidarity. In the devastated areas in early 1945, many hundreds of thousands of people were living in the most miserable state in the cells of ruins as it was at Sevastopol and Minsk in dug-outs in the earth along railway tracks and in windowless houses. They took no notice which the Ger. armies had advanced and retreated was laid waste. The most austere standard of living faced the people for the period which would be required for the

rebuilding of basic industry, communications, and administration. It is generally supposed that R lost at least 8,000,000 men in battle or missing, and at least another 5,000,000 people through German oppression and starvation. The cost was to be seen in the countryside as well as in the towns. A high proportion of the machine and tractor stations which supplied mechanical labour for the collective or state farms was destroyed in the W, and the result was that agriculture in the W areas and part of the L reverted to a condition worse in some ways than it was in 1940. Restoration to anything approaching pre-war condition was estimated to require at least four years. Ten years was the minimum estimate given for the time required for basic reconstruction in the towns and industrial areas, and then only on the supposition that much German labour would be employed and that machinery and industrial products would issue in abundance from Germany in reparations, while long-term credit would secure from the Allies machine tools, locomotives and other apparatus. The havoc wrought by the Germans in life and property explains to a great extent the insistence of Russian post-war foreign policy on rigid security for the future.

As the war drew to its close, party in-stinction was intensified throughout the Soviet Union and greater emphasis placed on the predominant role of the Communist party under Stalin's leadership as the chief directing force within the state. The Politbureau had removed the real power in the state throughout. In emphasising anew the need for ideological training and understanding, the Central Committee turned its attention first of all to the ranks of the party itself. Discipline was tightened. From 1939-41 to 1945 entry into the party was easier than at any time previously. Against the 1,600,000 members in 1939 there were nearly 6,000,000 in 1945 in spite of heavy losses in the war. In that year however, entry was once more to be gained as formerly, only after individual proof of powers of leadership and understanding of the Marx-Leninist political science. The party cadres were instructed to overcome 'any sentiment of bourgeois nationalism, private ownership and hostility to the collective farm system instilled by the German invaders' in instruction which obviously explains the critically hostile attitude manifested in the Soviet Union's normal channels of propaganda towards their wartime allies of the 'W bloc' in the period following the war. Love of country was and is strong in R and had been encouraged during the war, but afterwards *Soviet* patriotism was increasingly extolled devotion to a system as much as to country. The Communist party leaders as the war approached its end, were intent on ensuring that Soviet policy was fully grasped on ideological principles after the period of profound changes, which might well shake the outlook even of the most orthodox citizen of the Soviet Union. In the higher political

education of the people, the party leaders intensified their insistence on the superior adaptability of the Soviet system politically and economically, over any other system.

The chief requisite, according to their technique, was to ensure the removal of the last Fascist elements 'wherever they might appear which were denounced as potential disturbers of the peace and impediments to social progress.' So bitter towards the Germans was the Russian sentiment inflamed by evidence of the tortures inflicted by them on Russian men, women and children that the whole German people was held indictable while those in allied or neutral countries who suggested more discriminating treatment engendered in the Russian mind suspicions as to whether Britain and America would be resolute in upholding the Yalta settlement. These suspicions unfortunately gained the greater prevalence in R from the fact that Brit and Amer war efforts were disparaged or forgotten in the Soviet press.

Russian Foreign Policy after the War
The determination that Germany should be deprived of any means of further aggression or of possible support of sympathy in other countries largely accounts for Soviet post-war foreign policy as expounded by M. Molotov, a policy which in the discussions between foreign ministers and in the United Nations assemblies of the requisites for a general European settlement not seldom bewildered and dismayed R's allies. Russian foreign policy after the war was directed in reference to Europe to ensuring every where a government friendly to the Soviet Union. This in Russian eyes meant the exclusion from power of all parties or groups which played a dubious part before or during the war, the day of *kulakdom* in favour of peasants or small holders, and a Communist political and economic system. Political liberty for all ranks (except for the proven collaborators with the enemy), which is the Western conception of democratic reconstruction finds no place in Russian policy. Democracy to the Russian publicist means democracy of the left, a conception which inevitably brought R ever more in collision with public opinion in the U.S.A. The creation, announced on Oct. 6, 1947, at Belgrade, of the Cominform or new Communist International was an attempt by R not merely to organise all Europe on a Communist basis, but to draw into the same affiliation France and Italy through the Communist parties in those countries. The Cominform moreover represented not merely a passive alternative to the Marshall Plan (see *Marshall History*) but an active and avowed attempt to frustrate the success thereof. Simultaneously in the United Nations R strove to prevent the election to the United Nations of a number of states eligible on every ground except that they did not enjoy her favour. In Berlin R deployed her propaganda in yet another form when Marshal Sokolovsky marked the eve of the foreign ministers' conference of 1947 by the issue

of a voluminous and completely unfounded set of charges against the British and American elements of the Control Council in their administration of W. Germany. At every point throughout 1946-47 the Russian view was opposed to the W. view. The crux of this conference on Germany was the Potsdam (q.v.) provision that Germany should be treated as a single economic unit. So long as R. chose to act in defiance of this agreement (see REPARATIONS) it was inconsistent in M. Molotov to insist on four-power control of the Ruhr. The W. Allies contended that there must be four-power control of everything or nothing.

Throughout 1948 R.'s control of her satellites was strengthened by the speedy dissolution of non-Communist parties and the socialisation of land and industry. Open support was given to the Communist coup d'état in Czechoslovakia. Some opposition was at first met in Poland, but the pro-Russian faction soon triumphed. In Yugoslavia, however, Marshal Tito refused to submit and drew upon himself the violent anger of R. In Germany a blockade of Berlin was established to attempt to force the W. powers out of the city, but was successfully broken by air supplies. In 1949 R. seemed to become somewhat less aggressive towards the W. powers to concentrate on a firmer control of E. Europe. In May the Berlin blockade was lifted and in June there were delusive signs of progress towards a peace treaty with Austria at the foreign ministers' conference. At the United Nations R. continually denounced the aggressive intentions of the capitalist powers while stressing her own desire for peace. Her attitude prevented any progress towards disarmament and the control of atomic energy. In Sept. the Amer., Brit. and Canadian Govts. reported an atomic explosion in R. The latter claimed to have known the secret of the atomic bomb since 1947 and said that the explosion was connected with large blasting operations.

The chief concern of Russian policy was the defection of Marshal Tito from the Soviet bloc, and it is possible that Molotov was held responsible for this. Vishinsky succeeded him as foreign minister in March 1949. An economic blockade of Yugoslavia was imposed by R. and the satellites, and in June Tito was accused of having slid into the camp of the foes of the Soviet Union. A threatening note was published in Aug. and there were movements of Russian troops in Hungary. Elsewhere R. strove to prevent the growth of ' Titoism ' among the satellites and a series of trials and purges began to eliminate those who refused to accept that Communism outside P. must be an instrument of Russian policy. Rakj in Hungary, Kostov in Bulgaria and Gomułka in Poland were among the victims. Marshal Rokossovsky (q.v.) a Pole by birth but one of the most famous Russian soldiers, became minister of defence in the Polish Gov. and commander in chief of the Polish armed forces. In Germany the Communist regime set up in the Russian zone was rigidly controlled by

Moscow. In China the newly established Communist Gov. was immediately recognised by R. and her satellites.

LANGUAGE — The Russian language belongs with White Russian (see WHITE RUSSIA) and Ukrainian (see UKRAINE), to the E. group of the Slavonic sub-div. of the Balto-Slavonic branch of the Indo-European languages. Russian is the chief language of the U.S.S.R. and is spoken by over 100,000,000 people. Russian is extraordinarily rich in grammatical forms, its noun still contains the locative and instrumental case forms which some Indo-European languages had eliminated three millenniums ago. It possesses three genders (masculine, feminine and neuter), there are two adjectival declensions (case and gender form of numbers and a great luxuriance of verb forms. It is extremely rich in sounds and its alphabet, known as Cyrillic, consists of forty-three letters (see under ALPHABET). The Russian alphabet is amongst the most complete systems of writing. It contains however too many letters, some of which have become redundant. In its reform (Nov. 17, 1918) some letters were dropped and replaced by others representing similar sounds.

LITERATURE — Russian was the official language throughout the old Russian Empire and exercised a literary supremacy. Vernacular literature existed in some of the W. provinces but it was in the main strongly influenced by Russian models and forms. In the E. the folk literature which existed was not encouraged by the authorities. The Soviet Gov. has encouraged national culture in all parts of the Union, but in 1950 European R. still maintained the first place in literary achievement though here Ukrainian and White Russian literature (see under UKRAINE, WHITE RUSSIA) have since 1917, about 1860 and more especially since 1917, played a large part beside Russian proper.

The conversion to Christianity marks the real beginnings of Russian literature, though some of the legends of medieval R. probably have their basis in pagan mythology. This early literature consists of religious texts and legends or chronicles and Russian folk literature until the twentieth century continued to be founded on these early themes, though the characters altered in different regions and centuries so that the same plot might at varying times have as its central character Vladimir I., Ivan the Terrible, Peter the Great, etc. Russian folk literature was first seriously collected together during the nineteenth century when it literary merit was first recognised and this work has been continued since the revolution in the *bylina* (q.v.) or songs of popular Russian poetry were not collected in bulk until the beginning of the twentieth century. Of historical chronicles that of Nestor (d. c. 1114), which reaches down to 1113 is of great historical and literary value and the works of the annalists of Novgorod and Kiev etc. are still extant. The *igumen* Daniel described his adventures in Feodosiak during the first decade of the twelfth century and shortly afterwards Cyril bishop of Lutov wrote down

his sermons. Some indication of the progress of learning is afforded by the following dates which mark definite phases in Russian literary history. The MS of the *Ostromir Gospels*, which is the earliest in existence, was completed in 1057. The first complete Old Slavonic Bible was printed at Ostromir in 1581. The Academy of Kiev, where the talented poet and playwright Simon Polotski (d. 1680) was educated, and which in a dark age sustained literary progress, was founded in 1689. The first newspaper was established in 1703, and in the years 1746 and 1756 theatres were opened at Yaroslavl and St. Petersburg. Until the time of Polotski Byzantine influence greatly influenced Russian literature, but after his time Western European influences grew increasingly important. In the eighteenth century L. I. Kuchel'ev (1696-1750) wrote the official state history as opposed to a mere chronicle of events, and Sumarokov (1718-77) introduced drama on the classical pattern. In the reign of Catherine II authors found it politic to please the Imperial court. Literature was written largely in French, plays in French were produced at the court theatre, and the form and mood of drama and poetry were French. Karamzin (1749-1802) and Novikov (1744-1815), more independent and nationalist in their literary and political works, were both exiled to Siberia for their liberal ideas. The essentially national and greatest of all Russian poets is the brilliant Pushkin (1799-1837) whose *Prisoner of the Caucasus* (1822) is Byronic and whose tragedy *Boris Godunov* (1825) shows Shakespearean influence, though its tragedy is somewhat pompous and self-conscious. Yet his was essentially a creative genius as his lyrics and *Legend of Tzar Saltan* show. His fine prose style and delicate humour paved the way for the flowering of the Russian novel in the latter half of the century. Some of the splendour of his lyrics was maintained by Lermontov (1814-41) who owed much of his inspiration to Byron's influence and by the people's poet Kolstov (d. 1812). Nekrasov (d. 1877), strongly realist in tone, is the most noted of the modern poets. The Russian novel has taken deep root in Russia elsewhere. Gogol (1809-52), the author of the satirical *Dead Souls* (1842), *The Government Inspector* (1836), and the vividly vivid *Taras Bulba* (1833) and much to develop Russian satire and suggested a background of provincial Russian life later adopted fictitiously by Tchekhov, Turgenyev, and Saltykov (1826-89). He has found worthy successors in Turgenyev (1818-83), Dostoevsky (1821-81) and Count Leo Tolstoy (1828-1910) who were Russia's three outstanding novelists profoundly influencing the art of the novel in Western Europe, as well as in Russia. Turgenyev most affected the French novel, Dostoevsky's greatest successor was D. H. Lawrence. Tolstoy probably influenced the literature of his own country most and Soviet novelists of the period 1920-50 consciously followed the novel-pattern which he had laid. The *Crime and Punishment* (1866)

and *The Idiot* (1868) of Dostoevsky and the *War and Peace* (1869) and humble *Anna Karenina* (1877) of Tolstoy are landmarks in the history of fiction whilst the force of Tolstoy's personality in the fields of religion and economics has been felt in most corners of the Western world. Over the works of Turgenyev and Dostoevsky there broods a melancholy and a despairing sense of the futility of all effort to grapple with the present social and political wrongs. Goncharov (1812-1891) however, not concerning himself with these problems depicts in his masterpiece *Oblomov* (1859) the supreme domestic experience of the idle rich in pre-revolutionary Russia. Russian realism was continued by Anton Chekhov (1860-1901), and in its decline by Korolenko (1853-1921) but Chekhov's exquisite fineness gave place to Maxim Gorky's (1868-1935) cruel and revolutionary fervour while his negation of life was emphasised in Andreyev's (1871-1919) morbidity. In the literature of Russia as shown in the group of writers born during the second half of the nineteenth century, moods of depression and gloom are still those which predominate. The main figures in this group are Chekhov, Kuprin, Merezhkovsky, Arshavin, Zinaida Hippus, Kamysov and Maxim Gorky. They show remarkable skill in rendering certain morbidities of individual characters at war with circumstances or with their fellows. Only occasionally are there moments in which these writers, even in their short stories, feel stirred by anything approaching joy. Their moments of optimism are seldom and even Merezhkovsky regarded the literature of his own country as decadent. He sought to inspire Russian writers through Symbolism as a means to a Russian literary revival. Zinaida Hippus is one of the founders of Russian modernism of the period before 1914. Symbolist poetry reached its height in the work of Alexander Blok (1880-1921). The reaction against Symbolism produced some fine poets in Kuzmin (b. 1893), Gumilev (1896-1921) and Anna Akhmatova (b. 1889).

The 1917 revolution produced a long overture in present poetry in which the movement of I. S. Tsvetina (1892-1926) was prominent whilst poetry from and about the industrial proletariat was encouraged by Gorky who led the first proletarian anthology, *Our Songs* (1913). Gorky's reputation is based however on his vivid and sombre prose works. Generally speaking the literature of the early years following the revolution emphasised the revolution in an abstract quasi-philosophical manner. It included much poetry. Post-revolutionary literature, however, mostly took the form of prose, the realist novel underwent a remarkable revival. In the subsequent period of peaceful constructive effort notable works were produced by writers with established reputations before the revolution, such as Ilya Ehrenburg (q.v.), A. Tolstoy (q.v.), and M. Prishvin, while among young prose writers and poets of the 'intellectuals' were N. Tikhonov, Boris Polnina (whose

sensational novel of starving Russia, *The Bare Year*, appeared in 1922) K. Fedin, and others. In this period the worker-writers formed a group called 'The Smithy,' the best known of whose members were Gerasimov, V. Kasin and I. Gladkov, whose novel *Cement* (1925) took for its theme the struggle for the restoration of industry. Other novelists of this period are A. Serghimovich, V. Vercasayev and V. Ivanov. But in this period and subsequently Maxim Gorky still overshadowed all his contemporaries with such works as *Stories of the Years 1912-21* (*Reminiscences*) (1924), his realistic novel *The Atomonoff's Business* (1925) on the degeneration of a bourgeois family during the war and the revolution, and his great book *The Life of Klim Samguen* (1928, trans. *The Typhoon*) (1930) illustrating the life and psychology of the pre-revolutionary intellectuals. In the period of the first five-year plan Soviet literature generally improved in quality and widened its range; its inspiration was one more sought in the classical legacy of Russian and Western literature.

Among other writers of the period of reconstruction was Sholokov, the best known of all Russian authors, who achieved a worldwide reputation with his novel *Quiet Flows the Don* (the first vol. was pub. in 1928, in Eng. it appeared in two vols., *And Quiet flows the Don* 1934 and *The Don flows Home to the Sea* 1940, combined in one vol. as *The Silent Don* 1942) an epic of Cossack life before and after the First World War. His second novel *Turn of Soul* (*Turned*) (1932) is a realistic description of the problems of collective farming and its effect on Russian village life.

The years following the revolution have also seen considerable development of the literature of the national minorities comprised in the Soviet Union particularly in the Ukraine (Gogol and Aïmova (see separate articles). Before the Second World War there was no particular emphasis in Russian literature on the decadence of the West; exceptional attention was paid to Western classical and modern literature by the publication of collections of world individual novels and plays of Western authors, while a number of critical writers, particularly Rosanov, devoted themselves to the study of Shakespeare. After the Second World War however there was an increasing tendency to a more Westernized Soviet literature during the Second World War was largely propagandist in character, war novels, Wanda Wassilewska's *The Rainbow* (trans. 1941) was outstanding.

Russian Art Architecture. The conversion of Vladimir I to Christianity in the tenth century had much influence on Russian ecclesiastical architecture for it involved the introduction of the oriental glamour of Byzantium and the building of many churches in a barbaric land. Architects, artists, and workmen were procured and sent into Russia and Russians were sent to Ierograd (Constantinople), to be instructed in those arts of which they were ignorant. Painting,

wood carving, goldsmiths work, enamelling, embroidery, grew from these Byzantine roots' (C. G. I. Bunt, *Russian Art from Scythians to Soviets*). The cathedral of St. Sofia, Kiev, founded in the eleventh century by Yaroslav son of Vladimir has in the course of centuries been so much restored and enlarged that its former appearance has been radically altered. The church was originally of the square Byzantine form, the older portion forming a *chamber*. But if the exterior has lost its original aspect the interior has kept its Byzantine character, the mosaics and frescoes (some actually dated from the time of Yaroslav) having been restored with due regard to the spirit of the original and consistently with the conservatism of Russian religious art. St. Sofia of Novgorod founded in 1045 was built at a time when the influence of Byzantium on Russia was at its zenith and it was not until the succeeding century that the earliest modification from purely Byzantine forms was introduced. Thus famous if architecturally unimpressive cathedral was partly demolished by the excavating Germans in the Second World War (see Novgorod). As originally built it was of the most square Byzantine form. The interior is mainly fresco, the cruciform plan ornamented with modern frescoes.

Not only at Kiev and Novgorod but at Chernigov and other places in the more southerly parts of Russia the early church building followed the Byzantine tradition in its simpler, more severe form. In the more northerly districts however the influence of the wooden architecture of Scandinavia predominated. The well known church of the Transfiguration at Kij is a fine example of the wooden style perpetuated so late as the eighteenth century (C. G. I. Bunt). Modification of the Byzantine style is also illustrated by the architecture of the Vladimir Suzdal period, an important development which had its influence on later Russian design. In the late fifteenth century Russian architecture declined and lay made appreciable progress largely because the artists began to look to foreign architects, especially Italians, the Assumption Cathedral or cathedral of the Assumption (1372) at Moscow was rebuilt under the direction of Giovanni and another Italian design. The Grand Prince Palatine, the first public building in the Kremlin (*palace*) to be built of stone. The Piedmontese Aloisi was the architect of the Terem Palace (1499). Also built by Aloisi early in the sixteenth century was the cathedral of the Archangel Michael in Moscow and the cathedral of the Annunciation Blagovest (*church*). The most remarkable indeed fantastic example of Russian architecture to be found anywhere in the country is the Vasil' Cathedral (I. I. Iovskii, *Sibiri*) (1554-1679), standing at one end of the Red Square, Moscow. It is really a collection of chapels presenting the aspect of a jumble of pinacles of all sizes, colours and shapes. Yet the ensemble conveys the effect of barbaric splendour.

which defies criticism according to W standards.

W ideas prevailed in St. Petersburg in the time of Peter the Great who wanted to endow his new city with the elements of European culture. He introduced foreign architects among whom was Trezzini whose chief work is the church of Sts. Peter and Paul (1711). The palace of Peterhof with white walls and gilded baroque domes was designed by Le Blond and altered in the mid eighteenth century by the famous architect Rastrelli the younger who in 1741 built the old palace the famous Isarkoye Selo with the classical gallery of the Scottish architect



Soiet Weekly

VASILII ST. BASHI'S CATHEDRAL, MOSCOW

Cameron, who became one of the foremost instruments of the Russian classical revival. As a building it is mainly remarkable as a compendium of rococo interior decoration on the most lavish scale in R. The famous Winter Palace was also the work of Rastrelli typical of the Russian baroque style with its impressive facade facing the Neva. The mid eighteenth century saw the institution of the Academy of Fine Arts and with it the reaction to the Roman neo-classic of Catherine II's reign. The building of the academy was designed by its first prof. the Fr. architect V. de L. Mothe, and has the precise characteristics of the Fr. mind. Starov the first Russian of the classical school to graduate from the academy designed the Lauride Palace of Prince Potemkin. Simplicity and sense of proportion are the distinguishing traits of the Alexander Palace near the Isarkoye Selo the work of Quarenghi a pupil of Palladio. It is in fact at this period

of the establishment of the academy that we see the emergence of a school of modern Russian artists in architecture painting and sculpture although up to the October Revolution foreign influences continued to dominate the arts in R.

Architecture in the Soviet Union is one of the most problematical arts. In hardly any of the others is the uncertainty of styles the search for new forms of expression the desire for outward symbolism of an ill defined mode of life more strongly pronounced and yet in none of them is the goal so distant. Russian architecture in the years immediately following the October Revolution adopted the slogans of functionalism and constructivism in its resistance to pre-war imitative styles. The pressing need of new buildings especially dwelling houses could be largely met by the application of functionalism in style though the results generally were primitive and deficient in intellectual beauty. After the five year plans the situation changed markedly and the Soviet architects aimed at creating a new style which should be richer than any used before and at making Soviet architecture harmonious with the new political and economic order of the epoch. The general aims of construction and lay out of the new cities are based on the principles of achieving the maximum harmony between interests of the pop and the given enterprise the utmost development and of public institutions connected with the residential section. Soviet architects and artists generally hoped to break completely with pre-war ideas of W art and yet to achieve a style in the utilitarianism of purely functional structures. Yet they sought inspiration from the classicism of the late eighteenth and early nineteenth centuries. Soviet House at Leningrad shows the classical influence in its columnated facade. The famous Moscow Metro also illustrates the tendency to hark back to classicism. Other examples of recent Soviet architecture are the Nizami Museum Baku (1911) the Sanatorium at Sochi and the Lushinskaya embankment of the Gorky Park of Culture in Moscow. Gaudy taste seems to be often the proletarian's main concern. The walls of the vestibule of the Komsomolskaya Metro station are faced with marble glazed tiles and granite and the rest of the decorative scheme equally lavish and unrestrained. The enormous Hotel Moscow is in its style debased by fancy flourishes with a facade of monumental character ornamented in pseudo classical manner. Other specimens of recent Soviet architecture are further evidences of classicism misunderstood and conflicting styles. A pseudo Roman style of arches spoils the State Theatre in Baku while the House of Science in Novosibirsk possesses illogical colonnades and absolutely symmetrical plan surfaces in the rear. The concrete building of the *Pravda* by Golosovov is a much better example of Soviet architecture though it makes an excessive use of glass surfaces which is really unsuitable to the Russian climate.

Painting—Although the foundation of the Academy of Fine Arts in the eighteenth century gave the first real impetus to Russian painting, court patronage as in the case of architecture continued to be given chiefly to foreign painters. In the eighteenth century Russian painting continued to be almost solely devoted to portraiture. The leading Russian portrait painters of that century are D. G. Levitski (1733-1822), father of the Russian school of portraiture, and V. L. Borovikovski (1757-1826), a pupil of Levitski, both of whom studied under It or 11 masters in St. Petersburg. Borovikovski's Princess Suvorov in the Iretakov Gallery is full of life and charm. In Moscow Tropinin (1776-1839) was also a portrait painter with ability in characterisation. Venetsinov (1793-1857) evolved his own naturalistic style as a genre painter. His pupil Alekseyev, the first Russian landscape painter of invited note, is outstanding as a colourist. His successors in landscape painting are Ayazovskii (1817-1900) and Lebedev (1812-37). It was strongly influenced by the work of Ivanov (1806-38), especially in portraiture and in religious studies. Other religious painters are Ivan Kramskoi, Victor Vasnetsov, Nicholas Gay (of Ir descent), and Mikhail Nestorov (1862-1912). By this time Russian painting was reacting against the formalism and romanticism of the eighteenth and nineteenth centuries, the main factor in the growth of a truly national art being the establishment of the Society for the Encouragement of Artists in 1820. Petrov (1833-1882) is notable as a genre artist whose power is a portrait and is shown in his Fyodor Dostoyevski. Ilya Repin (1844-1900), one of the foremost historical painters, exhibits powerful dramatic feeling as in his Ivan embracing the Body of his Son. As a historical painter Vassili Vereshchagin (1812-1901) is celebrated for his world famous Retreat from Moscow.

Towards the end of the nineteenth century Russian art in most spheres was influenced by a modernist and impressionist World of Art movement. Of this movement A. Serey (1863-1911), whose fine portrait of Nicholas II is in the Tsukoye Solo I Levitov (1861-1900) and Vrubel (1856-1910) remarkable for his imaginative colouring, are the most notable. Ivor Gribun (b. 1851), one of the most famous painters of the pre-1914 war era, a pupil of Repin, was definitely influenced by the impressionism of Cezanne. After the revolution he turned chiefly to portrait painting, without however losing his former predilection for landscape. Also of the old or pre-Soviet generation are Samin whose landscapes are remarkable for their gay colouring, I. I. Mashkov, a strong colourist, and K. Petrov Vodkin, one of the few really original painters of this period. Petrov Vodkin's earlier pictures were strongly influenced by Im-

pressionism and his treatment tends towards decorative art. Alexander Gerasimov (b. 1881) shows the influence of Monet and Pissarro. In the years immediately before the Second World War his speciality was portraiture, his largest work completed in 1936, is the enormous picture The Founders of the First Cavalry Army. Today Gerasimov is one of the most favoured of Soviet painters.

Soviet painting in the years following the October Revolution was chiefly represented by the Futurist school which was directly influenced by the post-Cezanne European style. The chief artists in this group are Konechalovsky, A. Lentulov and I. Mashkov whose Cubist or Futurist tendencies are strongly marked, though the neo-primitive tendency also had its adherents in such painters as N. Goncharov and M. I. Mamonov. The traditions of the pre-Soviet epoch were maintained by the Right group, some of whom were attracted by subjects suggested by the revolution, the most prominent are A. Arkhipov, I. Moshkov, and K. Saitkin. The period (1922-27) was marked by the growth in groups of painter seeking a new style, such as the Association of Russian Revolutionary Artists (A.R.R.A.) whose members depicted themes from the revolution and experimented in new methods of composition. Of these groups the leaders were K. Itzin, a founder of the A.R.R.A., a portrait painter and a psychologist of the realistic school, and I. Brodsky and S. Karпов. D. Karlovskii contributed a whole series of well executed illustrations portraying the life of the revolution, P. Kuznetsov took such subjects as the national rebirth and revolutionary struggle of the peoples of central Asia, while Samin (see above) an Armenian painter depicted the rebirth in his country. In the 1930s the greatest changes were taking place in monumental works of art rather than in individual painting. The artist's house decorated one of the Moscow railway stations with paintings illustrating the work of Soviet construction while A. Deynka (b. 1900) and F. Antonov painted frescoes in the Commissariat for Agriculture. Deynka is a prolific painter with a most realistic outlook.

Stark realism characterises the work of Soviet war artists generally. Some of the best examples of this realism are G. Popov, S. Shavholders, D. Domodantov, I. Timosover, I. Fomigard and S. Timonov. We shall never forget other painters include Korm (b. 1902) and Loukmsky, both portrait painters, and Domagitsky and Bogayevsky. Landscape painters typical of the style of the younger generation is the work of Rybchenko as illustrated by his Moscow underground station and Palace of Soviets' interiors. Painters of the revolution and the civil war like Brodsky, G. K. S. and Loubimov are numerous. Graphic art K. Roudakov is prominent among lithographers, and his book illustrations are everywhere popular. A. Verbitsky, another illustrator, shows delicate draughtsmanship. Nivinsky was a famous Russian etcher, but his

successors have not mastered his technique or developed one of their own of comparable merit. Although working mainly in France and Germany, the work of the surrealist Marc Chagall, a Russian Jew, must be mentioned since his subjects are taken from Russian life and folk lore.

Sculpture—The art of sculpture was never looked upon with favour in old time Russia since all graven or modelled images were taboo in the Orthodox Church as savouring of idolatry. It was not until, with the importation of Western ideas in the eighteenth century, there came about a broader spirit of toleration that the art developed on such the same lines as painting. French artists and French art providing the paramount inspiration (C. G. F. Bunt). The earliest notable Russian sculptor was Count Carlo Maselli (*d.* 1741), father of Katsiteli, the famous architect to Elizabeth Ictovna, whose best works include the well-known equestrian statue of Peter the Great at Leningrad and a bronze bust of that monarch in the Winter Palace. Other noted sculptors of this earlier period include Gilel prof of sculpture at the Academy of Fine Arts (Academy of Fine Arts) (Academy of Fine Arts) a Fr. sculptor who became the art adviser of the Empress Catherine and Gilel's best pupils Shubin (*d.* 1805) and Kozlovski (*d.* 1802). As representatives of the classic period may be mentioned Shchedrin (*d.* 1825) a versatile sculptor of statues, monuments and bas-reliefs whose dynamic statue of Marsyas is in the Academy of Fine Arts (Leningrad). Gordiev and Prokoviev, Count Theodore Tolstoy (*d.* 1875) a romanticist and Ivan Vitya (*d.* 1875) are among the better known of those who exemplify the national spirit. Among sculptors of the nineteenth century whose work reveals a naturalistic vein are Kamenski, Antolski and Dubetskoi.

The main direction in Soviet sculpture since the early days of the revolution was in the direction of monumental works depicting episodes arising from the conflict between the Bolsheviks and the 'White Russians'. The most significant works of this time are the statue Karl Marx (1915) by Matveyev in Leningrad and the statue of Liberty in Moscow. Monuments for streets, squares and parks are a somewhat crude edition of a kind of classical style which is devoid of either the beauty of the antique or the intellectual quality of the Renaissance. Even sculpture eschew the old ideals of grace and tenderness, as may be exemplified in the thick-set female figures wrought by Somov. Real grace and delicacy of line are found in statuettes, bronzes, or ceramics and may be illustrated by the work of Kardashov and Matveyev. Schadr's colossal Lenin Memorial in Tiflis is said to be the greatest sculptural work of the Soviet age and in spite of his work is characterised by simple realism. Other Soviet sculptors of these years notably Chaikov were influenced by Cubist constructivism. A. Arhipenko (*b.* 1887) is one of the greatest exponents of Cubism. Sarah Lubedev's portrait

sculpture of revolutionary personalities is full of life and realistic beauty. Por trait heads by Ichnaikov and Korolyov indicate perhaps that Soviet sculptors' talents lie rather in characterising personalities than in plastics generally. The semi-impressionist and later academic sculptor N. Andreyev (*d.* 1932) a sculptor of a series of portraits and statues of Lenin had no rival in the portrayal of Lenin from life. Likhikhin one of the most original Soviet sculptors is best known for his works representative of central Asia.

Icon Painting—Icons (or ikons from *Gk. eikon* image) paintings or mosaics of sacred personages and themselves regarded as sacred art which in former centuries might be considered to be the characteristic expression of Russian religious thought and popular piety, became in the later centuries the chief symbol of Russian faith. The art of the icon consists in painting on panels of one or more pieces of wood glued together the panel being smoothed with pumice and primed with glue and chalk to receive the design either directly or is often in the case of the more elaborate icons through the medium of a kind of transfer used to ensure the right outline. The early eleventh and twelfth century icons were essentially Byzantine in inspiration and monochrome, whereas in the next two centuries brilliant colours are a quality of the icons of the Novgorod school which gradually evolved in individual style. The art reached its zenith before the end of the fourteenth century in the work of Andrei Rublev and for a century or more his influence was predominant. The early fifteenth century witnessed the development of the elaborate *iconostasis* (of the Church) or screen separating sanctuary from the main body of the church in which icons were placed. A new style in the art of icon was inaugurated by the Stragomay school in the late sixteenth century the master of which produced highly elaborate and intricate icons, mostly miniatures, while the seventeenth century saw the decline of the art into mere virtuosity, and by the nineteenth century the art had degenerated into a mass production monopoly in Vladimir. The art is still surviving in some degree without traditional methods and technique, but the expressiveness and quality of the colouring characteristic of the works of the best periods have been lost.

Goldsmiths' and Silversmiths' Work—In the goldsmiths' and silversmiths' work is exemplified in museum or great private collections of pre-1918 times, or at the Brit and Victoria and Albert Museums is remarkable for splendour richness of colour through polychrome enamelling, and liberal use of jewels. In the seventeenth century the work was typically Muscovite, but the eighteenth and nineteenth centuries showed a revision to Fr influences. Of all the decorative arts of R that of enamelling is perhaps the most characteristic as well as one of the most ancient. Greek Scythian work found

in the tumult of S. R. affords evidence that Russian artificers were not exclusively dependent on Byzantine models though there are many fine Byzantine specimens in Caucasus. The long Mongol domination of R. had a strong influence on the art of encaustic as it had on all other arts though at this time Western influences were also making themselves felt and the finest of Russian enamel belongs to this period. The imperial orb from the old Russian regalia of the seventeenth century shows no traces of that barbaric feeling which is predominant in much Russian art.

Music—Apart from the traditional music of the Gk. Church and a very rich and varied folk art R. made no significant contribution to music before the nineteenth century. It opera had been introduced by the court and during the reign of Catherine II (1762-91) by the author of librettos G. G. Galuppi (Paisiello), Cimarosa, and others. It produced operas in R. by invitation. Borotinsky (172-1825), a pupil of Galuppi, wrote chorale music for the Imperial Chapel at St. Petersburg. The Napoleonic invasion of 1812 was followed by a great artistic revival led by the dramatist Pushkin in R. the connection between music and letters has always been close. The first Russian composer of distinction was Glinka (1801-57) whose operas *I Life for the Tsar* (1836) and *Ruslan and Ludmila* (1812) are landmarks, their compound of folk convention with the vital strength of native folk music though not satisfactory as an artistic whole is the central root of later Russian music. His conscious nationalism was extended by Dargomyzhsky (1813-69) whose operas shunned melody and pursued natural speech rhythms and dramatic truth and by the St. Petersburg group known as the Five: Balakirev (1837-1910), Cui (1835-1918), Borodin (1833-87), Rimsky-Korsakov (1844-1908), and Mussorgsky (1839-1881). None of these was a professional composer by training. The leader and mentor of the group was Balakirev who was remarkable as much for his influence on the others as for the great harmonic originality and colour of his instrumental works. In 1862 he founded the Free School of Music at St. Petersburg in opposition to the conventional teaching of the official conservatories under the brothers Rubinstein. Cultural generalists served the cause more efficiently in journalism than in his music which is negligible. Borodin a prof. of chem. wrote little but nearly all of it especially his symphonies and quartets is of the highest quality and individuality. His unfinished opera *Prince Igor* is an epic grandeur. He was a great melodist and the dark colouring and rich harmony of his music reflect his oriental ancestry (his father was a Georgian prince). Rimsky-Korsakov wrote the first Russian symphony as a midshipman on a naval cruise. His fifteen operas, mostly based on folk tales, show a stronger gift for fantasy than for characterisation, his orchestral works are marked by great virtuosity, he

was also important as a teacher. Of the five Mussorgsky had most genius and least training. Imperial habits led to his early death and two of his major works were finished but his op. in *Boris Godunov* (1874) is a national epic of great dramatic power and has deeply influenced modern music. Until recently it was known only in Russian. Korsakov's version which will win for its harmony and orchestration. Mussorgsky was also a remarkable singer and poet, his speech rhythms of the Russian peasant in style, it is a first-class artistic

The following composer in Moscow was Eschukovsky (1840-93) whose style though not without a national strain was more influenced by the cosmopolitan Western tradition. A strongly emotional and subjective element in his symphonies has won him friends and enemies in large numbers. He used nearly all the traditional forms, probably his excess, especially *Igne Origin* (1877) and his brilliantly scored and in his ballets represent him at his best. His successors Taneyev (1866-1911), Arensky (1861-1906) and Rachmaninov (1873-1913) followed the cosmopolitan line, the last was a gifted writer for the piano. Glazunov (1865-1936) originally a follower of the St. Petersburg nationalist wrote symphonies and chamber music in the traditional idiom. A more eclectic taste was steered by Scriabin (1872-1915) who passed through a phase of romanticism to a mysticism based on theosophy under the influence of which he aimed at a synthesis of all the arts, not omitting colour and smell. Early in the twentieth century Russian national opera and ballet achieved worldwide fame and influence through the activities of the impresario Diaghilev who produced *Boris Godunov* in Paris in 1909, but the creative tradition was shattered by the revolution of 1917. Many capable composers took refuge in exile. Including Rachmaninov, Glazunov, Albin (b. 1880) who has written mostly for the piano in a strongly German style and Stravinsky (b. 1882) a pupil of Rimsky-Korsakov. Stravinsky's early ballets are remarkable for their barbaric power and reckless experiments in rhythm, colour and orchestration have attracted Russian favour. His later work written in Paris in U.S.A. betrays the contemptuous arch formalism of his own position neo-classical and far from anti-Russian (b. 1931) a pupil of composers more vivacity than wealth, was for some years in exile but returned to R. in 1954. The music of the Soviet era has been disappointing. Popular art has naturally been encouraged and valuable work has been done in the old style of folk music. On the many pieces of this kind but the excessive of political pressure on composers to gratify the popular taste (in effect the taste of the Communist Party leaders) has led to a decline of standards, especially as it has been accompanied by an extreme rejection of all modern Western music and a disingenuous manipulation of ideological jargon. Seldom has the bankruptcy of applying external standards

to art been more convincingly proved Shostakovich (b 1906) whose first symphony (1925) showed great promise and originality has more than once been censured by the authorities for such crimes as 'anti people formalism' and his talent has been allowed little chance to mature. Similar strictures have (1948) been passed on Prokofiev Minskofsky (b 1881) a prolific composer of symphonies, the Armenian Khachaturian (b 1903) whose work has a strong folk element and others. For Russian ballet see under BALLETS

republic control distribution and exhibition save for the five largest Moscow cinemas which are directly controlled by the Committee of Arts

In the 1920s Vertov experimented in camera angles and Kuleshov in cutting. Theories of the film began to be closely studied and particular attention was paid to the work of D. W. Griffith. His art of editing was greatly developed and its potentialities as the fundamental principle of the film were consciously realised. As a result the silent film reached its highest development in such works as



THE ODESSA STAIRS FROM EISENSTEIN'S 'THE BATTLESHIP POTEMKIN'
Revolutionary Cinema. 1st Film by 1925 and 2nd by 1926

THE THEATRE See DRAMA Russian Drama

FILM—In 1917 Lenin issued that for us the most important of all the arts is the cinema, and he and his successors valued the art not only for its entertainment value but also and in fact primarily as a vehicle for education and for the presentation of the Communist idea and achievements to Russia and the world. The industry was nationalised in 1919 and the State Institute of Cinematography established for research and to train technicians. By 1937 there were 21,000 silent and 300 sound projectors to serve a pop. of 160,000,000. The industry is controlled by the Committee of Arts. Each republic has a studio, and there are institutes in Moscow and Leningrad and a school in Moscow. Distribution trusts in each

republic. *The Battleship Potemkin* (1925), *October* (1928) and *The General Line* (1929) Pudovkin's *Mother* (1926), *The End of St. Petersburg* (1927) and *Siberia* (1928) and Dovzhenko's *Earth* (1930). The later history of the film everywhere was largely influenced by the Russian contribution particularly in the documentary type and in the use of music and association. Pudovkin's *Film Technique* (Leningrad 1933) was one of the first studies of technique and aesthetics.

The introduction of sound was made only slowly owing to contemporary economic difficulties and to the enormous number of silent projectors in use. A change of approach was also effected in the 1930s the younger directors preferring realism to the older aestheticism the new

attitude being exemplified in the Vassiliev brothers *Chapayev* (1934-35) notwithstanding its development of character with the aid of sound and the realism which it achieved without being pedestrian. Eisenstein's aesthetic experiments would seem also to have been affected by the campaign against formalism current at the time and his recent sound films are more static than were his silent films. Important Russian sound films include *Storm* (V. Petrov 1944) *He from Kronstadt* (L. Dzigan 1946) *The Baltic Deputy* (A. Zharkii 1937) *The Childhood of Maxim Gorky* (M. Donskoi 1938) *Alexander Nevski* (Eisenstein, 1938) *Peter the Great* (V. Iutov 1939) *General Surov* (Pudovkin 1941) and *From the Terrible* (Eisenstein 1944). Well known directors besides those mentioned, include Alexei Drov, Fimka Protasov, Frubig, Iurim Room and Roman Shostakovich and Prokofiev are among those in soviet countries who helped greatly to improve the standard of film music. In the introduction of stereoscopic films (see *STEREOSCOPY*) Russians played a principal role.

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Russian Front (First World War), Campaigns on. On the outbreak of the First World War the Russians occupied the 1 front, and at once invaded 1 Prussia their line making a salient in Poland. Being slow in movement the Russian forces were popularly named the 'steam roller'. Under the supreme command of Grand Duke Nicholas they advanced along the Kovno Posen railway and defeated the Gers on Aug. 16, 1914, at Gumbinnen securing the junction at Insterburg and driving the remnant into Königsberg on the coast. The Ger. Gov. alarmed at this menace called up Hindenburg (q.v.) in retirement who was sent, with Ludendorff (q.v.) as his chief of staff to stop the Russians. The study of the Prussian frontier in this region had been Hindenburg's sole occupation during his retirement. He rapidly collected an army and occupied a line at Tannenberg (q.v.) and between Aug. 26 and 28. Finally defeated two Russian Army corps which he caught in a drile.

The S. portion of the Russian forces swung forward from victory to victory over the Austrians. Brusilov (q.v.) and Brussilov defeated them decisively in Aug. 1914 along the line of the R. Bug and by the end of the month Brussilov had entered Galatz at Larnopol. Pressing on the Russians invested Iztumyl (q.v.) towards the end of Sept. and made for the passes across the Carpathians. The Gers made a counter offensive across Poland in Oct. 1914, causing the S. portion of the Russian forces to withdraw beyond Iztumyl. When the Russians regained strength they attacked the Austro-Gers 1 of the R. San and defeated them driving them beyond the riv. They then moved against Cracow during the first week in Dec. 1914 but this move was successfully countered by the Gers causing the Russians to withdraw behind the R. Dunajec (see DECA JEC SAN BARRIJS OF).

The year 1915 opened with a battle for the Carpathian passes but the Austrians made no headway. Hindenburg made a determined effort to clear the Russians from Warsaw, in which he succeeded by Aug. Further S. the Russians also withdrew in the Gdno region and a Ger. advance towards Riga was also partly successful. In 1916 the Russians defeated the Austrians at T. Kownitz and gained ground between Dubno and Kovel during the summer. Towards the end of the year they made strenuous efforts to link up with the Ukrainians, but these failed.

The Russian Revolution broke out in March 1917 and though the Russian Army remained in the field for some months after that event no operations of importance took place thereafter (see also GALICIA, CAMPAIGNS, WORLD WAR I FIRST (under various sub headings)).

Russian Soviet Federative Socialist Republic (Rossiiskaya Sovetskaya Federativnaya Sotsialisticheskaya Respublika,

R.S.F.S.R.), founded in Nov. 1917, largest of the republics of the Soviet Union, comprising 75 per cent of the area and 50 per cent of the pop. of the U.S.S.R. On the N. it is bounded by Norway and the Arctic Ocean, on the E. by the sea of Okhotsk and the Pacific, on the S. by Manchuria, Mongolia, China, the Kazakh S.S.R., the Caspian Sea and the Caucasian republics of Azerbaijan and Georgia, and on the W. by the Ukrainian and Byelorussian S.S.Rs., the Italian and Estonian S.S.Rs., the gulf of Finland, the Karelo-Finnish S.S.R. and Finland. For geography see under RUSSIA (GEOGRAPHY) and for administrative divisions under RUSSIA (AREA AND POPULATION). The R.S.F.S.R. is the most important republic economically, politically, and culturally. Its natural resources, both agr. and mineral, are immense; the cultivated area is some 250,000,000 ac. Over 100 nationalities are included in its pop. There are nearly 500 estates for higher education and many libraries, museums, theatres and scientific institutions. Communications in the republic have been extensively developed and many new cities built, such as Magnitogorsk, Stalinsk, Kirovsk. The cap. is Moscow. Area 141,000 sq. mi. Pop. 100,000,000.

Russian Wolfhound see POITVOI.

Russo-German Campaigns in Second World War, see EASTERN FRONT.

Russo-Japanese War (1904-5) The essential cause of this war was in the conflicting interests of Russia and Japan on the mainland of Asia. Russia in her endeavour to become a great naval power sought a port in the P. O. which would be free from ice all the year round and which would form a good naval base. In 1896 she secured lease of Port Arthur from China and connected this port with St. Petersburg by means of the Trans-Siberian railway. She also sought to transform Dairen (Dairen) into a great Asiatic port. In 1900 Russia extended her power over the Chinese prov. of Amur and sought the recognition of her suzerainty over the country. Opposed by both Japan and England she finally agreed to evacuate the whole of the territory which she had filled from China. Beyond withdrawing her troops from S. Manchuria and Mukden she declined usually to carry out the terms of the agreement. Finally in 1903 a proposal emanating from Japan and suggesting that the integrity of China and Korea should be vouched for by the contracting parties, at the same time proposing that Russian interests in Manchuria and Jap. interests in Korea should also be safeguarded was refused by an optimistic and short-sighted Russian Gov. Japan withdrew her minister from St. Petersburg (Jan. 26, 1904), and within two days had landed troops at Chemulpo, and a day later defeated the Russian fleet at Port Arthur. Adm. Togo inflicted heavy loss on a Russian fleet under Makarov in Apr. Meanwhile a second Jap. army under Oku had landed on the Liaotung peninsula and had won many victories. The railway communication between the Russian army and Port

Arthur was severed. Kinchau was captured, and after the victory at Nanshan, Dainy was occupied by the Jap and made a new base of operations. The Russians were forced back until finally after three days' fighting Lunan tun fell into the hands of the Jap. The defeat cost the Russians nearly 15 000 men. The main result of the fifteen days' almost continual fighting which had started on Sept. 9 was the loss to the Russians of over 50 000 men. The investment of Port Arthur by the Jap had in the meantime begun. After strenuous fighting each step being keenly contested the main vantage points had been captured by the Jap. On Aug. 10 a naval sortie took place but was defeated broken up and driven back and the Vladivostok fleet came to the aid of the Russians at Port Arthur was also badly defeated. On Nov. 23 Meteor Hill was captured and the tin and hubbly at the mercy of the big Jap guns. By the end of the year the chief fortresses were in the hands of the Jap, and on Jan. 2 Port Arthur surrendered and on March 10 Mukden was occupied by the Jap. In Oct. 1904 the Russian Baltic fleet had sailed for the Far East. It caused a diplomatic incident by firing on the Hull trawlers believing them to be Jap warships.

It was surrounded on May 27 by the Jap fleet in the straits of Tsushima and practically annihilated, 4000 men were killed nearly 8000 captured and almost the whole fleet was sunk. This was the decisive battle of the war. In Aug. terms of peace were arranged at Portsmouth U.S.A. and the Russians received not unfavourable terms. Russian rights in Port Arthur and Dainy passed to the Jap. Sakhalin was divided between the opposing countries, no indemnity was to be paid by Russia, the Manchurian railway became the property of Japan, Korea became a Jap sphere of influence. Manchuria was evacuated by both armies and referred to China whilst valuable fishing rights in the Beimg Sea were ceded to Japan. Japan lost roughly about 170 000 men whilst the war cost Russia about 400 000. See C. A. Court, *Rampington (The Times correspondent) War in the Far East 1904*; K. I. Asakawa, *Russo-Japanese Conflict 1904*; I. Hamilton, *Staff Officers Scrapbook 1904*; and A. N. Priboy, *Tsushima 1905*.

Rust, reddish-brown hydrated ferric oxide ($2\text{FeO} \cdot 3\text{H}_2\text{O}$ brown hematite) which forms on iron or steel on exposure to moist air. Iron does not rust when in contact with dry air but if a drop of water be placed on the surface the presence of a reddish substance can be observed in a short time. Again when iron has once commenced rusting, the process continues rapidly owing to the fact that R. is itself hygroscopic and absorbs water from the atmosphere. Crum Brown attempted to show in 1888 that carbon dioxide was necessary to the phenomenon. He held that ferrous carbonate and hydrogen were produced, the carbonate being then oxidised to form ferric hydroxide with the liberation of carbon dioxide. Later experiments, how-

ever, show that pure iron does not rust in contact with pure oxygen and pure water even when carbon dioxide is present. On the other hand the acids, other than carbonic commonly found in the atmosphere promote rusting. The evidence points to the phenomenon being partly a result of electrolytic action. Impurities in the iron render the metal liable to rust in the presence of water and oxygen, apparently because iron particles and impurity particles may form the poles of an electrolytic cell enabling ferrous ions to pass into solution; these are then oxidised to the ferric state. This fact has led to methods for diminishing the corrosion of iron by limiting the galvanic action to a more active metal. Thus by causing an iron surface to be closely adherent to a zinc coating the galvanic action is largely limited to the latter the iron being thus preserved. The zinc coating also prevents contact with the air so affording additional protection to the iron.

Rustehuk, Ruschuk, or Russe, tn. of Bulgaria, 139 m. N.W. of Varna on the Danube. Its chief manufactures are earthenware and tobacco. It is the seat of a Bulgarian bishopric. Pop. 50 000.

Rustenburg, tn. of the Transvaal, 60 m. by rail from Pretoria, built named by the Magaliesberg Mts. (centre of a tobacco-growing dist.) Pop. (European) 300 (native and Asiatic) 3000.

Rust Fungus (Uredinales) large and important section of fungi comprising about 1700 species all of which are obligate parasites on higher plants. The name rust refers to the appearance of the summer pores (uredospores) which are formed in tremendous numbers on the leaves or stems of the host. The R. F. are allied to the *Ustilaginales* (Smuts) and are included with them in the group of fungi known as Basidiomycetes which also contains the common mushroom and the truffle-trees. Many R. F. are *heteroecious* i.e. they alternate between two different host plants as for instance *Puccinia graminis* the black rust of wheat which occurs also on the barberry (*Berberis vulgaris*). This particular species is said to cause a reduction in the wheat crop of N. America and Australia of up to 50 per cent. See L. L. Brooks, *Plant Diseases*, 1928.

Rustless Steel, see STAINLESS STEEL.
Rutebeuf, or Rustebeuf, (1230-80) French poet, he and Jean de Meung were the greatest of their time. His best works are short lyrical and mystical poems and satires, but he was exceedingly versatile and tried almost every form of poetry and prose. He is the oldest representative of personal poetry in lit. literature.

Ruth, George Herman (Babe) (1895-1948) Amer. baseball player, born in Baltimore and educated at St. Mary's Industrial School there. In 1914 joined the Baltimore Orioles as a pitcher and outfielder. He later proved himself an outstanding left-handed pitcher with the Boston Red Sox. From 1920 to 1933 he played as an outfielder with the New York Yankees, returning from baseball in 1938. He established many records and his

outstanding play and colourful personality made him a national hero.

Ruth, book of the O.T. being the second of five of the 'Megillot' or 'Rolls,' is an anonymous work of great beauty giving an exquisite picture of the life of the time it depicts. The date of its composition is unknown but it belongs evidently to the period in which Heb. literature was at its best. It is laid by the author in the time of the Judges. The central figure is Ruth, a Moabitess who becomes the great grandmother of King David. In the Jewish canon it is placed between the Song of Songs and the Lamentations and in the Jewish ritual it is read on the Feast of Weeks or Pentecost.

Ruthenia, Sub-Carpathian Russia, or Trans-Carpathian Ukraine, area of central Europe formerly part of the Austro-Hungarian Empire. Between the two world wars it was the name of the most E. prov. of Czechoslovakia. From 1938 it was occupied by Hungary and became a centre of guerilla resistance in central Europe. In 1941 Czechoslovakia ceded this prov. to the Ukraine. Poland also ceded it and Rumania did so in 1947. The whole area was thus absorbed into the Ukrainian S.S.R. Covered by the Carpathians in the N. in the S. are fertile lowlands producing maize and vines. There are wide stretches of valuable forests. The chief mineral is rock salt which was here mined in the Stone and Bronze Ages and by the Romans. Uzhorod was the cap. of Czech R. which had an area of 4886 sq. miles. Pop. of the whole area is estimated at 1,500,000. The Ruthenians are a Slav people forming a branch of the Little Russians. By religion they are Catholics in communion with Rome retaining however their old Slavonic liturgy with Roman modifications. Married men may become priests but not monks (Basilians) or bishops. Since 1945, however it appears that the Ruthenian Church has suffered much persecution.

Ruthenium (symbol Ru, atomic weight 101.07) metallic chemical element. It is found in platinum ore and is usually obtained from the residues left when osmium is separated from osmiridium. It is a grey metal resembling platinum, has a sp. gr. of 12.5 in the electric arc and has the power of dissolving gases.

Rutherford, Daniel (1871-1937) Scottish scientist, b. in Edinburgh. He studied medicine at Edinburgh Univ. In 1902 he estab. the distinction between nitrogen (although he did not give it this name) and carbonic acid gas. R. later discovered the presence of nitrogen in air. Subsequent study on the constitution of natural gases was founded on his work.

Rutherford Mark, see **WILLIAM HALL**.

Rutherford of Nelson, New Zealand, **Ernest Rutherford**, first Baron (1871-1937). b. at Brightwater, New Zealand and educated at Nelson College and Canterbury College, Christchurch, and later at Trinity College, Cambridge, where he did research work under J. J. Thomson at the Cavendish Laboratory. For a short

period he continued his work on Hertzian waves which he had started in New Zealand using a simple detector the core of which consisted of needles each 1 cm. long and seven hundredths of a millimetre in diameter with which he received signals three quarters of a mile away. He did not continue his researches on wireless waves having no interest in its commercial side and was soon immersed in the new research which was destined to open up enormous fields in which he afterwards attained world-wide renown. His work on uranium radiation was developing along very interesting lines when he was offered and accepted in 1915 the professorship of physics at McGill Univ. Montreal. During his nine years there he carried out his great work on radio activity and the alpha particle and the



LORD RUTHERFORD
A. & S. T. Spicer Sims

subject of radio activity took on an enhanced interest after it had shown the corpuscular nature of the alpha radiation. In 1900 he was appointed prof. of physics at Manchester Univ. where he developed the electrical method for counting alpha particles, which gave good agreement with Röntgen's scintillation method. In collaboration with Royds R. showed that alpha particles on which the positive charge had been neutralised were helium atoms. Soon afterwards he determined the number of alpha particles in unit volume of gas and the result 2.7×10^{18} atoms per c.c. conformed to Avogadro's law and provided a direct proof of the discrete nature of matter. R. took a prominent part during the First World War in organising research on underwater acoustics to combat the submarine menace but by the middle of 1917 when practical methods were proving successful he resumed his work on nuclear physics attacking by new methods the problem of alpha particle scattering. In 1919 he was elected Cavendish prof. of experimental physics in the Univ. of Cambridge,

and during the period 1925-30 great improvements were made by his colleagues in experimental technique. The harvest of such improvements was reaped in later years and 1932 has been truly described as the commencement of a new era in nuclear physics. In that year the disintegration of the nuclei of atoms was accomplished for the first time by means of charged particles which were accelerated by using high voltages in vacuum tubes. In addition the properties of the neutron which R had predicted some twelve years previously were verified. It did suddenly and his ashes were placed in Westminster Abbey near the remains of Newton Kelvin Darwin and Sir John Herschel.

Among the many honours conferred on him were 1903 Bressa premium of the Academy of Science Turin and in the same year the Nobel prize for chem. 1914, Knight Bachelor, president of the Brit. Association for the 1923 meeting, 1925 member of the Order of Merit, 1927-30 president of the Royal Society to which he was elected in 1902 and which afterwards awarded him the Copley medal for his work on radioactivity, 1930 chairman of the Advisory Council of the Department of Scientific and Industrial Research, 1931 etc. 1934 per 1935 director of the Royal Society Mond Laboratory. He was the recipient of a number of honorary degrees from various univs. and in addition to a large number of papers which appeared in different scientific pubs. he was the author of *Radioactivity* (1901), *Radioactive Substances and their Radiations* (1912), and *The New Alchemy* (1937). See A. S. L. Rutherford, *Being the Life and Letters of the Late Rt Hon. Lord Rutherford* 1939; I. B. N. Evans, *Man of Power, the Life Story of Baron Rutherford of Nelson O.M. F.R.S.* 1939; and N. Rutherford, *Lord Rutherford* 1940.

Rutherford, Samuel (c. 1600-61) Scottish divine b. at Nisbet Roxburghshire. He graduated at Edinburgh Univ. in 1621 and was in 1623 appointed regent of humanity but was deprived of his office in 1626 and became pastor of Anwoth Galloway. In 1636 he pub. a treatise against Arminianism for which he was summoned before the High Commission at Edinburgh and forbidden to exercise his ministry, but he returned to Anwoth in 1638 and was made prof. of divinity at St Mary's College St Andrews the same year. He was one of the commissioners of the Church of Scotland to the Westminster Assembly (1643) and in 1651 was appointed rector of the univ. of St Andrews. He joined those who condemned the treaty with Charles II as sinful and was deprived of his offices. His reputation rests chiefly upon his *Letters*, first pub. in 1664. See lives by A. Thompson 1884, and R. Gilmour 1904.

Rutherglen, royal and municipal burgh of Lanarkshire, Scotland, situated near the Clyde 2½ m. S.E. of Glasgow. It is the oldest royal burgh in Scotland, having received its first royal charter in 1126. In

the Middle Ages it was a town of considerable importance, but with the rise of Glasgow it declined. It is now, however, a thriving industrial community. Shipbuilding and coal mining were formerly the main activities but they no longer exist and they have been replaced by other important industries including iron and steel, chemicals, paper, ropes, furniture and mining machinery. A minor industry is the making of oat cakes. R. was burnt down in 1568. It forms part of a co. constituency. Pop. 26,000.

Ruthin, or Rhuthyn, municipal bor. and market town of Denbighshire, N. Wales, 21 m. from Chester. The 'Red Castle' from which it takes its name was built about 1280, the present structure was erected in the nineteenth century on the same site. Pop. 4,000.

Ruthven, Baron, Scottish title borne by the family of Hore R. The first creation of the title was in 1187 when Sir Wm. I. was made a lord of Parliament. Wm. fourth lord who was made earl of Gowrie in 1551 was responsible for the seizure of the boy king James VI (see JAMES VI, RAYNOR). For a short time he held the land in the young king's name but after the latter's release, he was executed (1584) for treason. The title then became extinct but in 1651 it was granted to Sir Thomas R. from whom the present holder Walter Patrick Hore R. (b. 1850) ninth Scottish baron R. and second United Kingdom baron R. of Gowrie is descended. The heir to the United Kingdom title is Alexander Gore Arkwright Hore R. V. (first earl of Gowrie created 1944) and first baron (created 1935) of Cantieri and Duleton. He was governor of S. Australia 1928-31, of New S. Wales 1931, and governor-general of the Commonwealth of Australia 1936-44.

Ruthven, Raid of, Scottish conspiracy which took place in 1582. The earls of Gowrie and Mar, Lord Lindsay of the Byres and the master of Glamis seized the person of the boy king James VI and took him out of the keeping of his guardians, the duke of Lennox and the earl of Arran.

Ruthwell, vil. of Dumfriesshire, Scotland, 10 m. from Dumfries and 7 m. from Annan by road or rail. Noted for world-famous eighth century runic cross which now stands in the par. church. It is 18 ft. 6 in. high with carvings of scenes from the life of Christ and part of the Dream of the Holy Rood attributed to Cadmon, and is wonderfully preserved. The first Savings bank was opened in the vil. by the Rev. Henry Duncan in 1810, the Savings Bank House is open to visitors. Pop. 700.

Rutile, mineral consisting of titanium dioxide (TiO₂) generally impure. It crystallises in the tetragonal system and twinning phenomena are frequent. The crystals range in colour from yellow to reddish brown and in sp. gr. from 4.2 to 5.2 according to the amount of ferric oxide present, hardness 6. It is found enclosed in schist, ss. rocks and in clays and slates in the form of fine needles. It is used to produce a yellow colour in glass and porcelain.

Rutland, Duke of, *see* **MANNERS, JOHN JAMES ROBERT**

Rutland, Dukes of, long title borne by the family of Manners. Richard Plantagenet duke of York who was slain in 1461 was earl of Rutland and through his daughter he was ancestor of Thomas Manners who was made earl of R. in 1525 being granted estates in Leicestershire. A later earl married Dorothy Vernon and obtained estates in Derbyshire. John ninth earl, was made duke of R. in 1703. Charles fourth duke, was lord lieutenant of Ireland under Pitt. John James Robert seventh duke (*q.v.*), was succeeded by his son and then his grandson succeeded to the title. The tenth duke (b. 1919) Charles John Robert Manners succeeded to the title in 1910. The duke's eldest son is called the marquis of Granby. The duke's seats are Belvoir Castle Leicestershire, and Haddon Hall Derbyshire.

Rutland, Rutland co. of England bounded N. and E. by Lincolnshire, S. and W. by Leicestershire and S.E. by Northamptonshire. Its surface is broken by low hills forming a series of which the chief is the vale of Catmose. Between Oakham the county and Uppingham the co. was at one time covered by a field of Icknield Forest part of which was Beaumont Chase. The principal rivers are the Welland, Wash, Chuter and Eive. Almost the whole co. is under cultivation wheat forming the main crop, turnips and swedes being also grown. Numbers of sheep and cattle are reared and cheese is manufactured and known as Stilton. Lime stone is quarried. The co. contains five hundreds and returns one member to Parliament. The castle has a good Norman hall. Area 100 sq. m. being the smallest co. in England except London. Pop. 17,400. *See* **VICTORIA COUNTY HISTORY, Rutland 1908**. *See* **VICTORIA COUNTY HISTORY, Rutland 1912**.

Rutland, city and co. seat of R. co. Vermont, U.S.A. 47° 10' S.W. of Montreal. R. is the centre of an agricultural district. It has marble quarries, a marble shipping industry and marble monument works. There are also iron foundries and boiler shops. Pop. 17,000.

Rutland Isle, *see* **INDIAN ISLANDS**

Ruth, *see* **GRUTH**

Ruvo di Puglia, town in prov. of Bari, Apulia, Italy. 20 m. W. of Bari. Its cathedral dates from the twelfth century. Pottery is manufactured. Pop. 26,900.

Ruwenzori, or Ruwenzori, name of mts. of Central Africa between Lake Albert and Edward. It was discovered by Stanley (1857-8) and has a length of 65 m. with a breadth of about 10 m. The highest point is Mt. Stanley (16,000 ft.). The climate is very damp and the annual rainfall about 180 in. The vegetation varies with the zones which are well marked but owing to the amount of moisture mosses and lichens occur in several of the zones.

Ruysbroek, Jan van (1291-1381) mystic theologian, b. in Ruysbroek near Brussels. He was educated in Brussels and

became priest in the church of Saint Gudule in 1318. In 1343 he retired to the solitude of the forest of Soignes and six years later built a monastery there. His works written in Flemish, were translated into Lat. by Surin in 1519. *The Adornment of Spiritual Marriage, The Sparkling Stone and The Book of Supreme Knowledge* have been translated into Eng. by Evelyn Underhill 1916 and *The Kingdom of the Fathers of God* 1919.

Ruysbroeck, Wilhelm (Rubruquis, Guillaume de) (c. 1220 c. 1234) Flemish medieval traveller and missionary b. in Brabant. He entered the Franciscan order and was sent to the Holy Land on a mission. In 1253 St. Louis IX. of France sent R. and two other friars on an embassy to the Mongol prince Sartuk and to the Mongol emperor, Mangku Khan. The return journey was made by way of Cairo and Syria to Tripoli in N. Africa. He wrote an account of his travels in Lat. *See* H. H. Herbert and others, *Der Bericht des Lanzesheims Wilhelm Ruysbroeck* 1934.

Ruysdael, or Ruysdael, Jakob van (c. 1625-82), Dutch landscape painter b. at Haarlem. He studied surgery but, on Berchem's advice, took up painting. In 1649 he became a citizen of Amsterdam but he never made even an adequate livelihood from his paintings. His favourite subjects were woodland scenes and he is especially famous as a painter of trees but he also excelled in coast scenes and sea piece as well as in painting cloudy skies. Some of his pictures are in the National Gallery London.

Ruyter, Michael Adrianzoon, *see* **DE RUYTER**

Ruzicka, Leopold (b. 1887) Swiss chemist of Czech origin b. at Vukovar. He studied at the technical high school at Karlsruhe. He held chairs of organic chem. at Utrecht and Zurich. His greatest work was his research on polymethylenes and their derivatives and compounds. In 1919 he was awarded with full merit the Nobel prize for chem. He became a foreign member of the Royal Society in 1912.

Ryan, Loch, bay in Wigtownshire, Scotland between 9 and 10 m. long and about 2 m. wide forming an excellent harbour. The port of Stranraer is in L.P.

Ryazan, *see* **RYZAN**

Rybinsk, town of the R.S.F.S.R. region of Yaroslavl, on the Volga, 40 m. N.W. of the town of Yaroslavl. It was an episcopal see, had a cathedral and an arsenal and is the centre of the Volga transit trade. Ships and printing machinery are its industries and it is a centre of the cattle industry. Pop. 19,000.

Rydal Water, lake of Westmorland, England at the foot of Rydal Mount in the valley of Ambleside. It is 4 m. long and 4 m. broad. Rydal Mount was the home of Wordsworth from 1813 to 1930. Rydal village leads to the F. of R.W. *See* **also** **LAKE DISTRICT, III**.

Rydberg, Abraham Viktor (1828-9), Swedish author b. at Jonköping. He studied at Lund Univ. and afterwards became a journalist on a Liberal paper in Gothenburg. His novel *The Last of the Athenians* (1859) showed his sympathies

with an anti-theologian outlook, and his book *The Bible's Teaching about Christ* (*Bibels lär om Kristus*) (1862) was among the first works to place the aspects of modern biblical criticism before the Swedes. In 1882 his collected poems were published. Up to a point R can be considered as the last of the Romantic school in Sweden. His poetry is profound and marked by his idealistic outlook. In his later years he was prof. of cultural hist. at Stockholm Univ.

Ryde, 1. Seaside resort and municipal bor. in the Isle of Wight, England, 79 m from London. It occupies the site of a vil. called in Norman times *La Rye* or *La Ricio*. Though in the eighteenth century it was merely a fishing vil. it has rapidly grown into a fashionable holiday resort. It has an esplanade nearly 2 m long and the pier originally built in 1812 but since then extended forms a promenade half a mile in length. Near by is the twelfth-century abbey of Quarr. There are ruins of a sixteenth-century castle. Pop. 20,000. 2. Or **Kissim, Point**, a station of New S. Wales, 12 m S.W. of Sydney. It has three orange orchards. Pop. 100.

Rye, municipal bor. of Sussex, England, 10 m N.E. of Hastings on the R. Rother. It is originally a port town and dates from very early times as is shown



MERMAID STREET, RYE

by its large old church and Ypres Tower (twelfth century). There are six picturesque streets, a fourteenth-century Landgate, and the remains of other medieval fortifications. The Mermaid Inn is famous. Pockock's school was founded in the seventeenth century. John Fletcher, the dramatist, was b. at R., and

Henry James lived there from 1898 to 1916. Its chief industry is fishing, and it is one of the Cinque Ports. It is now 2 m from its new harbour on the estuary. The silting up of the old harbour caused the sea to recede, and destroyed the commerce of R., which was a flourishing port in Norman and Angevin times. There are the remains of Carmelite and Augustinian buildings. Pop. 4400.

Rye (*Sacale cereale*) hardy grass, unknown in a wild state, and extensively cultivated in parts of Europe for its grain, which is somewhat similar to that of wheat. Its flour makes a dark coloured bread. It is rarely grown for its grain in Britain on account of its susceptibility to ergot, but is not uncommonly sown to produce a green crop for consumption in the spring. Its long, soft straw is used in harness making.

Rye Grass (*Lolium*) a valuable grass in permanent and temporary pastures flourishing in rich dry soils. It R. G. (*L. dactyloides*) a larger and more robust plant, grown only in temporary pastures, and on a large farm it yields enormous crops of green food or hay.

Rye House Plot, The (1683) name given to a conspiracy to murder Charles II. and the duke of York. It was so named after the place at Holesden in Hertfordshire where it was arranged to take place by some of the most distinguished of the Whig party. Though it was only a few desperate men who met at a session, yet indignation was most naturally felt against the whole Whig party. Wm. Lord Russell, Algernon Sidney, and the earl of Essex were arrested and confined to the Tower where Essex died by his own hand and the other two were executed. See H. Amhurst, *Russell and the Rye House Plot* 1919.

Ryeland Breed, see SHEEP

Rye Spurred, see LILACS

Rykov, Alexei Ivanovich (1881-1938) Russian statesman, b. at Saratov. Educated at the Univ. of Kazan. In 1901 he was imprisoned and expelled from the Univ. for revolutionary activities, and became acquainted with Lenin. On the day Lenin joined the party, he joined it, and he adhered to the Bolshevik section, and was subsequently arrested and imprisoned on several occasions for political activities. He became a member of the Politburo soon after the revolution of 1917, and during Lenin's presidency R. was vice-president. He was president of the Council of People's Commissars from 1924 to 1930, when he was succeeded by Molotov. He became commissar of internal affairs in 1931. In 1933 he became compromised in the Zinoviev and L. I. Sokolnikov trials and was expelled from the Communist party. He was named in the Bukharin-Rykov treason trial of May 1938, being charged with betraying Communism, and was sentenced to death.

Rylands, John (1801-88), Brit. manufacturer and philanthropist, b. at S. Hildes. In 1809 he established a cotton-manufacturing business with his father and brothers at Wigan. He became sole proprietor in 1847, and the business was

converted into a limited company in 1873. R. spent large sums on charity and public services, and on printing religious works for free distribution at home and abroad. He was an original financier of the Manchester Ship Canal. The John Rylands Library, Manchester (opened in 1900), was erected as a memorial by his widow. See JOHN RYLANDS LIBRARY.

Rymer, Thomas (1641-1713) Eng. historian and critic, b. at Yafforth, York-shire. He was educated at Sidney Sussex College, Cambridge, and was called to the Bar in 1673. His first important works were *The Tragedies of the Last Age Considered* and *A Short View of Tragedy*. These were much discussed, especially as they contained criticisms of Shakespeare and Ben Jonson. He is chiefly remembered as the compiler of the invaluable collection of historical materials known as the *Fœdera* (13 vols.) 1704-13. He succeeded Shadwell as historiographer royal in 1692.

Rymill, John Riddock (b. 1903) see under WATKINS, HENRY GEORGE.

Ryssel, see LISSIE.

Ryswick (modern Rijswijk), tn. of the Netherlands in the prov. of S. Holland, 2 m. S.E. of The Hague. In the castle the treaty between England, Holland, Spain, France, and the Ger. Empire was signed in 1697, which put an end to the war between France and the Ger. Empire, England, Spain, and Holland. By it France gave up all tns. and dists. seized since the treaty of Nimègen in 1679, retaining only Strasburg, and undertook to recognise William III. as king of England, promising to give no further aid to James II. Thus Spain recovered Catalonia and Mons. Luxembourg and Courtrai, while the duchy of Lorraine went to Leopold Joseph and the Dutch regarrisoned Namur and Ypres. Pop. 5500.

Ryton, urb. dist. of Durham, England on the Tyne, 6 m. by rail from Newcastle.

Its industries are coal mining, sand and gravel quarrying and agriculture. Pop. 14,000.

Ryukyu Islands (called also **Riu Kiu**, **Luchu**, and **Loo Choo**), string of is. which stretch from about 50 m. S. of Kyushu, Japan, to a point 100 m. E. of Iomosa. There are four groups: from N. to S., Tokara Gunto, Amami Gunto, Okinawa Gunto, Sakishima Gunto (*gunto* signifying a group of is.). There are about forty is. of any size and the total pop. is nearly 500,000. The cap. city is Suifu, in Okinawa, but Naha in the same is. is the chief port and trading centre of the is. The R. I. belong to Japan, but are peopled by a race distinct from the Jap. and allied prof. ably with the Amos (*q.v.*). Originally independent, the Luchuan acknowledged the suzerainty of China from the fourteenth century, and not until the nineteenth century did Japan lay claim to the is., which was disputed by China. But Japan established her sovereignty when, in 1894, I formost, a former Chinese possession, was also occupied. The prin. industries among the is. are the planting of sugarcane and the manu. of red lacquer. For the campaigns on Okinawa during the Second World War, see PACIFIC CAMPAIGNS OR EAST ASIAN FRONT IN SECOND WORLD WAR.

Rzeszow, tn. of Galici, Poland, 41 m. E. of Lwow. It holds famous fairs, and its staple industries are jewellery, cloth, and linens. Pop. 27,500.

Rzhev, tn. in the region of Kalinin, R.S.F.S.R., 70 m. S.W. of Izer on the Volga and 150 m. from Moscow. It has machinery, oil pressing, leather, saw-milling and hemp industries. R. is an important railway junction and was a key point in the Ger. drive for Moscow in the autumn of 1941 and was captured by them in Oct. Pop. 34,000. See further under EASTERN FRONT OR RUSSO-GERMAN CAMPAIGNS IN SECOND WORLD WAR.

S

S, nineteenth letter of the Eng. alphabet and the eighteenth of the Gk. and the Lat. alphabets. The exact Semitic alphabet (which became the ancestor of all the existing alphabets including the Gk.) had four sibilants which still exist in modern Heb. *sayin* which became the Gk. voiced sibilant *z* *samelh* *Sade* (an emphatic *s*) and *shin* (*s sh*). The Semitic *ameth* which still existed in the Phoenician variety of the Gk. alphabet and in the Etruscan alphabet was also retained as *ei* (*i*) in the Ionic alphabet while the name *samelh* became *sigma* and was transferred to the letter derived from the Semitic letter *shin*. The Gk. *s* was represented either by a sigma derived from the Semitic *Sade* or by *san* derived from Semitic *shin*. *Sade* and *san* do not appear together in any Gk. alphabet but they do appear in the Etruscan which on one hand was a descendant of the Gk. and on the other hand was the ancestor of the Roman alphabet. While *san* has become the classical *sigma* *sade* is found mainly in Coptic, Thracian, Melos, Phoenician, Paphlagonian, and its colonies. The Lat. *s* (thus also the Eng. *s*) has descended from the Gk. *sigma*. *S* is the plain sibilant in the Eng. alphabet and represents two chief sounds. Its normal sound is the *s* in *this* for its sound in such a word is *these* would be more accurately denoted by *s*. In the words *sure* and *sugar* it would appear to have the sound of *sh* but the intruding letter is in this case due to the vowel. It is interesting to note however that the Heb. alphabet has one symbol for *s* and *sh* a dot being added above this symbol (respectively to the right or to the left) to differentiate the sound *s* from *sh*. *S* generally remains constant through the classical and low Ger. groups of the Indo-European family. The High Ger. *s* becomes *st* in Eng. as Eng. *water* High Ger. *Wasser* Eng. *king* High Ger. *König*. In Chem. *S*, *Se*, *Sc*, *Si*, *Sm*, and *Sr* are the atomic symbols for sulphur, scandium, selenium, silicon, samarium and strontium respectively.

SA and **SS** (*Sturm-Abteilung* *Schut* *Staffel*) paramilitary organisations of the Nazi party. The SA (infantry and cavalry) was the storm troop or army of the early Nazi party. It was organised in 1923 ostensibly for the purpose of protecting party meetings, but in fact was intended to be the army of the Nazi revolution. Estimates of its strength varied from about 500,000 to 2,000,000. Differing from his friend and adherent Rohm as to the function of the SA troops Hitler organised a special detachment to be his own political executive. This was the origin of the SS, i.e. 'protective squad' or blackshirts formally organised in

1928 as an elite by the side of the SA. Then organisation was military like that of the SA but included all services including artillery and Hitler himself had an SS regiment of Life Guards. A few days of the SS were professional, but the remainder as in the case of the SA served in their spare time. They are believed to have numbered between 300,000 and 500,000. Police and executive functions of the SS were similar to those of the SA but the SS were employed in the more responsible tasks. Chief of the SS was Himmler (11).

Saadabad, Pact of (1934), see under **ARMENIAN IRAN, PERSIA**

Saadia ben Joseph (Sa'id al Fayyumi) (b. 12-112) Jewish philosopher b. at Dilaz, Upper Egypt. In his twentieth year he completed his first great work, a Heb. dictionary. He next pub. a work in defence of traditional Judaism and against Karism and other heresies. He left Egypt at the age of twenty-three with the intention of settling in Palestine but his contests against various innovators of the calendar brought him into such prominence that about 1250 David ben Zakkai, head of the Jewish community of Babylonia, appointed Saadia president of the school at Sur. The glory of the rival school of Lombardine intrigued with the Khalid and had Saadia disposed. Saadia devoted himself to literary labour for four years. He wrote in Arabic into which language he translated most of the Bible. He dealt also with the Talmud and liturgies and he produced some works combining religion with philosophical reasoning showing a thorough acquaintance with Aristotle. The chief of these lists is *Kitab al Tanqid wal Ibtihadat* or Book of Articles of Faith and Doctrines of Dogma known in Heb. as *Sefer Emunat David*. Saadia reconciled to David and under a new Khalid was reappointed to Sur in 1138. There is an extensive bibliography of Sa. in Singer's *Jewish Encyclopedia*. Sa. J. Guttmann, *Die hebr. philosophische Saadia* 1882. Sa. J. Guttmann, *Saadia* 1900 and H. Meier, *Saadia his Life and Work* 1921.

Saale 1. Sixten or Thuringian *S* river of Germany, trib. of the Elbe rises in the Fichtelgebirge, Bavaria and flows northward for 226 m. to join the Elbe 2 m. above Magdeburg. Length 273 m. 2. Franconian *S* river of Germany, trib. of the Main which it joins at Gemünden. Length 70 m.

Saalfeld, tn. of Thuringia, Germany the *Saale* 87 m. W. of Leipzig by rail. It is noted for manufacture of machinery, paints, oil cloth, and beer. It was probably founded by Charlemagne. The Fr. defeated the Prussians here in 1806. Pop. 23,300.

Sabadilla, see **CTVADILLA**

Sabaean Inscriptions, see under **MINÆAN INSCRIPTIONS**

Sabaëans (Saba'oi) and S. Semitic people, which inhabited S.W. Arabia. The Sabaean inscriptions are the main source for the study of the once flourishing kingdom situated in the ter. bordering the Indian Ocean and the Red Sea, and known from the Biblical Table of Nations (Gen. x) as Sheba. Other sources of information are cuneiform and Ethiopic inscriptions, the Gk. geographers and the record of Pliny, Gallus, expedition. The date of the establishment of the Sabaean and other S. Arabian kingdoms cannot yet be determined with accuracy. It may be assumed, however, that S. Arabia became an important centre of civilisation in the 1st centuries of the second millennium B.C. The queen of Sheba who visited Solomon (1 Kings x 1) is generally allowed to have come from this country, and not from Ethiopia as Josephus relate (*Antiq. Jud.* viii 6 sec. 5). During the first millennium B.C. it was a highly civilised agr. region producing the frankincense so valued by anc. religions. In the Bible it is spoken of as rich in incense, spices, precious stones, and gold (1 Kings x 1-20; Is. lxvi 6, Ps. lxxxv 15) and as carrying on an extensive commerce with the other nations of Asia (Isa. lxviii 22; Job vi 19; Jer. li 8). It served also as the main route by which goods from India were transported and carried overland to the ports of the E. Mediterranean. In the Rom. period the region was known as Arabia Felix. By the time of the establish. of Islam S. Arabia had lost its importance to N. Arabia. The later development wrecked the older civilisation and relegated these fertile lands to historical obscurity (see under **YEMEN**).

Sabaria, see under **SOEMBATHIA**

Sabah, see **PORT OF BRITISH NORTH**

Sabaki, riv. in Brit. I. Africa rises about 1° 45' S. and under the name of Atli in its upper courses flows N.E. then S.E., and finally N., until it enters the Indian Ocean about 5° N. of Malindi. Length 400 m.

Sabatier, Paul (1851-1941) Fr. chemist, noted for originating the method of hydrogenating organic compounds as to which see under **HYDROGENATION**. For this and his researches in catalytic action he was awarded (with another Fr. chemist, Victor Grignard) the Nobel prize for chem., 1912.

Sabatier, Paul (1858-1928) Fr. Protestant theologian and historian, writer, b. at Saint Michel de Chabrilhonnoux (Ardèche). He studied at the Univ. of Paris and ultimately became pastor of Saint Cécile-la-Serre. S. did valuable work in the dept. of early Franciscan hist. His *Le de saint François d'Assise* (1892) is the best life of St. Francis yet written. His work, *L'Orientation religieuse de la France actuelle* (1911) was trans. by H. B. Binns as *France To-day: its Religious Orientation*, 1913. *L'Influence de saint François d'Assise sur la civilisation italienne* appeared in 1926. See lives by P. G.

Little 1929, and G. Maugham and H. Leimaitre, 1931.

Sabatini, Rafael (1875-1940), Brit. novelist and dramatist, b. at Cors. Italy, of an It. father and an Eng. mother, and educated in Switzerland and Portugal. He wrote a number of popular historical novels, including *Baruchus the Magnificent* (1906), *Inthony Wadding* (1910), *Sea Hawk* (1915), *Sarramuche* (1921), *Captain Flood* (1922), and *The Black Swan* (1932). He also wrote many plays and biographies of Cesare Borgia (1912) and Torquemada (1921). His best works were *King of Russia* (1914) and *Tribulent Times* (1916).

Sabbatai Zevi (1626-76) Jewish mystic and false Messiah, b. at Smyrna. Taking advantage of a prophecy which had long been extant among the Jews that the promised Messiah was to appear in 1666, S. proclaimed himself mid. of all religions, enthusiasm of over 8,000 followers. The sultan, Mohammed IV, severely alarmed, called him to Constantinople, and having compelled him to embrace Islam, banished him to Albania.

Sabbath (from the Heb. *Shabbath* to rest, to cease, to end) Jewish day of rest, a covenant between Israel and God, enjoined seven times in the O.T. and to this day one of the cornerstones of Judaism. Its origin is much disputed. Nevertheless, in scholarship, trace the origin of the Heb. S. to Babylonian and base this suggestion on the hypothesis that the sacredness of the seventh day amongst the Hebrews arose all through the phases of the moon, seeing that in Heb. literature S. and new moon are often mentioned together. It may, however, be recalled as reasonably certain that the S. is as old among the Hebrews as their monotheism.

The proper observance of the S. was a point of much controversy in v. varied at different periods of the religious hist. Whereas the O.T. merely lays down the general law that no manner of work is to be performed on the S., which it alludes to as a day devoted to the study of what it does or does not constitute a description of the S. Yet there is not the slightest austerity about the observance of the S. For instance, manifestations of mourning, which extend for a week after the burial of a deceased relative, have to be suspended on the S.

The Heb. S. falls on Sunday, but it begins at sunset on Friday and lasts through Saturday until three stars are visible. The early Christians observed the S. as Jews and the Lords' Day as Christians, but Gentile converts were not compelled to observe it. The early church writers never identify the two, but medieval legislation shows a tendency to increase in strictness. The early reformers, Luther, Zwingle, Calvin, Beza, Knox, etc., all favoured the lax observance, and the same is true of the Eng. reformers. Strict sabbatarianism began with the Puritans.

Sabbatical Year, institution of the anc. Hebrews, occurring every seventh year, based on Leviticus xxv 2-7, and Deuteronomy xi 1 ff. It was rather of a civil and

social than a religious character. Indeed no particular religious services were prescribed for its celebration, but the land was to be left untilled, the vineyards were to be undressed and the spontaneous produce of both was to be enjoyed by all the people in common. Provision was made by the special interposition of God to supply the deficiency of food which this abstinence from labour for a whole year would necessarily cause. If a loan had not been repaid by the S. Y. it could no longer be claimed. Yet no person should for this reason refuse to lend to such as would borrow.

Each seventh year was proclaimed as a S. Y. In other words just as the weekly Sabbath (7) rest was to be a short cessation from the cares of ordinary life so that the individual could gather fresh strength and vigour for his weekly toil so on the greater Sabbath there was to be a universal cessation of national life as a means of restoring all the earthly constituents of God's kingdom (Israel) once again to their original and necessary purity, health and uprightness.

There is however no actual record of the practical observance of the S. Y. in the Heb. sacred books though it is frequently discussed in the Talmud.

Sabelianism, heresy preached by Sabelius an African bishop or presbyter about the middle of the third century. It was anti Unitarian, teaching that there is but one person in the Godhead, God the Father, that Christ was but a man, and that the Holy Ghost is an energy, not a personality. It became almost extinct by the fifth century.

Sabians (from Arabic *sabi*, pl. *sabi* or *sabi'ah*) term applied by the Muslims to a few religious sects. It is uncertain to whom the term applied in Mohammed's time. In post-Mohammed times, the name S. was given to a Hellenistic pagan sect of Mesopotamia centred on Harran (the Rom. Carrhae). The followers of this sect were star worshippers and apparently employed Syria as their liturgical language. In A.D. 50 they were identified by the Muslim authorities with the S. of the Koran and therefore could enjoy a toleration not granted to mere heathens. They survived until the eleventh century A.D. Some famous Arabic scholars such as Ishaq ibn Qurrah and his son Sinan, were S. of Harran. It is also the father of the great astronomer Al Battani.

Sabina (d. A.D. 183) Rom. empress the wife of Hadrian and great-niece of Trajan. She married Hadrian about A.D. 100 but the marriage proved most unhappy and tradition reports that on his deathbed the emperor forced her to kill herself lest she should have the happiness of surviving him.

Sabina, Poppea, see POPPEA SABINA.

Sabine Dialect, see under LATIN LANGUAGE AND LITERATURE.

Sabine Pass, in Jefferson Co., Texas, at the mouth of the Sabine R. It exports cotton, oil and timber. S. P. is at the head of the Sabineaches waterways, a network of canals, making inland travel accessible to shipping opened in 1915.

Sabines, or **Sabini**, in ancient history an important people of central Italy dwelling in the mts. N.E. of Rome from the Mons Esquilus and borders of Ilia to the Tiber. They were of Umbrian Sabelian stock, allied to the Oscans and the Samnites were their descendants. Ruto (Rutii) was their chief. The rape of the S. women in the legendary list of early Rome is famous. The S. were finally subjugated by the Romans under M. Curius Dentatus (c. 290 B.C.). They received the Roman franchise (*sine suffragio*) in 268 and after the Social War of 90 became amalgamated with the Romans.

Sabis see SAMBRI.

Sable (*Mustela sabelina*), valuable fur-bearing animal which on account of excessive persecution is now restricted to a part of Siberia where it is captured in its winter coat for the lustrous fur of commerce. It is about 18 in. long exclusive of tail and the colouring is usually brown. Like other members of the marten family it is nocturnal in habit feeding on rodents and birds.

Sable Island, in N. Nova Scotia 100 m. S.E. of Cape Canso. Its sandbanks and prevailing fog have caused many shipwrecks. There is a wireless station.

Sables d'Olonne, Les, seaport in the dept. of Vendée, France on the Bay of Biscay 23 m. S. of La Roche-sur-Yon, is a favourite summer resort and the centre of sardine fisheries and a cunning industry. Pop. 17,600.

Sabotage, term used to denote organised hindrance to the normal progress by employees who use this method of expressing the extent of their dissatisfaction. It can be violent, resulting in the destruction of machinery or in physical damage to the tools of the workers, or those who take their places when a strike is in progress. A more subtle form of sabotage and one which is more general is that which causes delay in the process of production. Slow work, sometimes referred to as 'cannery' or a meticulousness of service of rules which are normally tacitly ignored, can be a serious embarrassment to the employer. Improved machinery of negotiation between employers and workmen has caused a diminution of this form of tactics. The term is very commonly used to describe the destructive attacks on communications and in factories or public or other works by underground or clandestine resistance organisations against the Germans in the occupied countries during the Second World War.

Sabrata (*Sabiratha*), coastal city of ancient Tripolitania in W. of Tripoli. It was originally a Punic settlement, later it became a prosperous Roman municipality, and early in the second century A.D. received colonial status. Its prosperity was based on the export of the olive oil for which Roman Africa was famous, and on a trans-Saharan traffic in gold, ivory, ostrich feathers, and slaves. Excavations have revealed an imperial city of considerable distinction, with basilica, forum, temples, churches, baths, shops, houses enriched by mosaic floors and walls and

a large amphitheatre A Brit expedition worked at S in 1948

Sabre, see **Sword**

Sabzawar, or **Sebzewar**. 1 Tn in Khorasan Persia, 115 m W of Meshed, has a large trade in silk, cotton, opium, dried fruit, and sheep's skins, copper is mined. Pop (estimate) c 15,000 2 Tn in the prov and 72 m S of Herat Afghanistan It has an important market and fortress

Sacæ, anct nomadic Scythian tribe of central Asia, probably dwelling near the sources of the Oxus (Amu Darya) and Jaxartes (Syr Darya), in the modern regions of Kashgari and Yarkand These 'Scythians of the Persian N frontier' served in Xerxes' expedition against Greece and aided Darius at Arbela (331 BC) against Alexander

Saccharimetry, the estimation of the strength of solutions of sugar It is frequently effected by observing the effect of the liquid upon the rotation of polarised light in a polarimeter or 'saccharimeter' Reducing sugars, eg glucose may be estimated by Fehling's solution

Saccharin or **Ortho-sulphobenzimide**, $C_6H_4(SO_2)(ONH_2)$ was discovered in 1879 by Remsen and Fahlberg It is prepared by the action of alkaline permanganate upon orthotoluenamide and treating the alkali salt of ortho sulphaminobenzoate with dilute hydrochloric acid S is a white crystalline solid melting point 220°C It is about 300 times as sweet as sugar and is used as a sweetening agent, particularly by diabetics and others for whom sugar is contraindicated

Saccharomyces, see **Yeast**

Sacchetti, Franco (c 1880 c 1890) It novelist b at Florence where he later held several official positions His most important work is a collection of *Novelle* written in imitation of the *Decameron* and first pub in 1924 Ten of them are trans in 1 Roscoe's *Italian Novelists* (1925) His *Opere* have been pub in 2 vols (1936-38) See also *Index Franco Sacchetti Burger von Florenz und Dichter* 1939

Sacchi, Andrea (c 1498 1661) painter though greater in the theory of the art than in its practice b at Nettuno near Rome He studied under Francesco Albani and imitated and taught after the art of Raphael Nicolas Poussin and Carlo Maratti were his pupils His two masterpieces *Vision of St Romuald* and *Miracle of St Gregory* (the latter in mosaic) are in the Vatican

Sacco and Vanzetti, Case of, see **Vanzetti**

Sacerdotalism (Lat *sacerdos* a priest) the name for the system of the priesthood with special reference to the claim to sacramental or supernatural powers by virtue of ordination See **Priest**

Sacher-Masoch, Leopold von (1836-95) Austrian novelist, b at Lemberg His *Geliebte Geschichten* (Gallician Tales), pub in 1876, were penetrating studies of Polish-Jewish life Later he became a portrayer of sexual abnormalities From his name is derived *masochism*, sexual perversion

in which pleasure is got from being dominated or tortured

Sacheverell, Henry (c 1674 1724), Eng controversialist, b at Marlborough, and educated at Marlborough and Magdalen College, Oxford He became preacher at St Saviour's, Southwark, in 1705. In 1709 he delivered his two famous sermons at Derby and St Paul's, London, in which he expressed extreme High Church and Tory views These discourses, having been printed, were brought under the notice of the House of Commons, which passed a resolution denouncing them as 'injurious, scandalous and seditious libels' The author and printer had to attend at the bar of the House, and it was resolved that S should be impeached with high crimes and misdemeanours The trial commenced before the House of Lords Westminster Hall, Feb 27, 1710, and lasted till March 23 S was pronounced guilty and was suspended from preaching for three years It is asserted by Swift and other authorities that S's real offence, in the eye of the Whigs, was his having in one of his sermons pointed, as was conceived at the Lord Treasurer, Godolphin, in a passage about the crafty insidiousness of such wily Volpoms, 'Volpone' was a popular nickname for Godolphin The popular celebration of this important conclusion of the trial, and, when S set out to take a living in Shropshire, his journey was a continued triumph It is probable that this affair contributed to the overthrow of the Whigs the following autumn On the expiration of the sentence (1713) S preached at St Saviour's church on the Christian triumph, and shortly afterwards Queen Anne presented him to the rectory of St Andrew, Holborn See 1 Madin *Bibliography of Dr Sacheverell* 1887

Sachs, Curt (b 1881) Ger musical historian b at Berlin He studied hist at Berlin Univ and composition with Hugo Schittenholz later theory with Kretschmar and Johannes Wolf In 1919 he became head of the state collection of old musical instruments in Berlin In 1933 he left Germany, settled in Paris, and later in U S A, where he became prof at New York Univ His books include studies of the hist of the dance, and music musical instruments (including *The History of Musical Instruments* 1940) the hist of music in Berlin etc and he is the editor of the Br collection of gramophone records of old music *Anthologie* see 111

Sachs, Ferdinand Gustav Julius von (1832-97) (Ger botanist b at Breslau He was appointed prof of botany at the Univ of Freiburg im Breisgau in 1867 From 1868 till his death he was prof of botany in Würzburg, rejecting subsequent offers of chairs at still more important univs He is known chiefly for his investigation of the morphology and metabolism of plants, the influence of light and heat on plant growth, and the formation of flowers, but there were few branches of botany to which he did not make some material contribution His first pub work was the *Handbuch der Experimental-*

physiologie der Pflanzen (1865), and his next the well known text book *Lehrbuch der Botanik* (1868), a comprehensive work digesting botanical knowledge up to his time. This work was carried further in his very able *Vorlesungen über Pflanzenphysiologie* (1882), which, however, never attained the popularity of the earlier work. His *Geschichte der Botanik* (1875) is an erudite hist. of the development of the different branches of botanical science between the mid sixteenth and nineteenth centuries.

Sachs, Hans (1494-1576) Ger shoemaker-poet b at Nuremberg, Germany. He flourished at the time of the Reformation, to which he was converted and which he helped to propagate by his ready pen. His production was voluminous, and over 6000 different compositions are ascribed to him. Some of these are contained in the ed. of his works in 22 vols., pub. by A. von Keller and F. Goetze (1870-94). In his *Meisterlieder* he spread a knowledge of Luther's Bible among the poorer classes and even made use of classical subjects. All his compositions show great shrewdness, liveliness, and keenness of satire, together with a steady manliness of tone and in many of them give a vivid picture of sixteenth century Germany. S. is the central figure in Wagner's opera *Die Meistersinger*. See accounts of his life and work by R. Genée (2nd ed. 1902) and C. Schweitzer, 1889, M. Hermann *Die Bühne der Hans Sachs*, 1923, and H. Münch, *Die Sozialen Anschauungen des Hans Sachs*, 1934.

Sachsen, see SAXONY

Sachtlevén (Sattlevén, or Zatchlevén), Cornelis, or Cornelius (c. 1606 c. 1655), Dutch painter and engraver chiefly of low life subjects. His genre pictures are in the style of Brauwer and Teniers. Dresden Gallery and Amsterdam Museum have examples of his work.

Sachtlevén, Herman (1609-82), Dutch landscape painter and engraver brother of Cornelis, and pupil of Van Goyen. His pictures were chiefly of scenes on the Rhine and Maas and are mostly in Holland, Denmark, and Germany.

Sachu, tn and oasis in China 40° N. and 94° 5' E. The oasis is extremely fertile. Pop. 22,000.

Sack, name used for a favourite wine of the time of Shakespeare. It is really a 'dry' cherry as opposed to sweet wines but it was often used for Canary wine and was frequently flavoured with spices and mulled.

Sackbut, in scriptural times the instrument mentioned in Daniel (3. 5) the Heb. *sabza* is said to have been a large harp, of which the word sackbut may have been taken. It was another form (Hastings). The old Eng. S. was in early form of the trombone the name probably deriving from the Fr. *sacquebut*.

Sackett's Harbor, vil. in Jefferson co. New York, U.S.A. on Black R. Bay Lake Ontario, 11 m. W. S. W. of Watertown, it is a U.S.A. naval station and military post. Pop. 2000.

Sack Mead and Sack Metheglin, see under MEAD

Sackville, Charles, see DORSET, sixth EARL OF

Sackville, Lord George (1716-85), Brit. soldier b in London, younger son of the first duke of Dorset. During the reign of George II. he was employed both as a statesman and as a soldier, he served at Dettingen (1743) and Fontenoy (1745), and at the battle of Minden (1759) he commanded the Brit. forces under Prince Ferdinand of Brunswick. Having failed to execute the prince's order to charge by which defeat the victory was rendered less decisive than it might have been, he was by his commander and at his own request, recalled to England, where he defended a court martial by which, April 5, 1760, he was adjudged incapable of serving thereafter in any military capacity. George II., who was highly incensed at S.'s conduct, took every means of rendering his punishment most galling. After the death of George II. he returned to public life and sat in Parliament from 1761 to 1782. Having attached himself to Lord North he was made secretary of state for the colonies in 1771 and had the direction of the Amer. war. In 1782 he with his leader, retired from office having been raised to the peerage with the titles of Viscount S. and Baron of Oldbrook titles united to the dukedom of Dorset by the accession of Lord George's eldest son to that dignity. See I. Carlyle *Frederick the Great* vol. viii, and I. Marlow, *Sackville, Lord of Drayton*, 1918.

Sackville, Thomas, see DORSET, THOMAS SACKVILLE first EARL OF

Sackville, scaport in New Brunswick, Canada, at the head of the Bay of Fundy, 90 m. N. E. of St. John. It has stone townships paper box and concrete manufacturing, and the local agriculture produces strawberries and blackberries large quantities of which are shipped from the port. S. has a Methodist college. Mt. Allison Univ. Pop. 1000.

Sackville-West, Edward Charles (b. 1901) Brit. novelist and biographer son of Sir Charles John S. W. soldier. Educated at Eton and Christ Church, Oxford. He was at one time literary ed. of the *New Statesman* and has pub. much literary criticism in other periodicals. His first novel was *Piano Quintet* (1922) and his others are *The Hunt* (a Gothic novel 1926), *Mr. Drake over the Water* (a novel 1928), *Soyuz* (1931), and *The Sun in Apricot* (1934). In 1936 appeared his life of J. K. Quincey with the title *The Flame in the Night*. As a member of the B.C.C. (Literature and Drama dept. 1911-4) he was in charge of most of the poetry programmes and wrote a large radio drama *The Rescue* (1935), on the subject of the *Odyssey*.

Sackville-West, Victoria (b. 1892), Brit. poet, novelist and biographer, daughter of the third Baron Sackville. Married Harold Nicolson (q.v.) with whom she travelled in the Middle E. writing an account of her travels in *Passage to Icheran* (1926). She won recognition with *Heritage* (1919) a novel and *The Hour* (1922), short stories. Her verse, *The Land* (1926), on the year's cycle of an

Eng. farmer, with occasional lyrics, was awarded the Hawthornden prize (1927). Her chief novels include *The Edwardians* (1930), *All Passion Spent* (1931), *The Dark Island* (1934), *Saint Joan of Arc* (1936), *Pepita* (1937), and *Grand Canyon* (1942). Biographies: *Aphra Behn* (1927), and *Andrew Marvell* (1929). Other verse: *The King's Daughter* (1930), *Collected Poems* (1933), *Solitude* (1938), *Selected Poems* (1941), and *The Garden* (1946). With her husband she pub. in 1945 the anthology *Another World than This*. *Knole and the Sackvilles* (1923) is a narrative of her ancestral home and its occupants.

Saco, city of York co. Maine, U.S.A. on the Saco R. 12 m. S.W. of Portland. It has manufs. of cotton goods, cotton machinery, bricks, belting and carriages. Pop. 8600.

Sacrament, religious rite serving as an outward sign of the grace it confers by virtue of its divine institution. Originally, *sacramentum* meant the Rom. soldiers' oath of fidelity. Christian writers however use it partly to mean a sacred mystery in general (e.g. the Incarnation) partly in the sense given above (e.g. Trinitarian says of baptism: 'Blessed sacrament of water by which our sins are washed away and we are liberated into eternal life' (*De Baptismo*)). Later this ritual use of the word prevailed and seven ss. were held of divine origin, viz. Baptism (confirmation, the Eucharist, Penance, Extreme Unction, Holy Order and Matrimony). This is to day the doctrine of the Rom. Catholic and the I. Churches. The Protestant Churches for the most part restrict the word to Baptism and the Eucharist, which the Eng. catechism declares to be 'generally necessary to salvation'. But there is considerable variety of opinion in the Church of England in admitting seven ss. See also BAPTISM, COMMUNION, EXTREME UNCTION. See J. C. Lambert, *The Sacraments in the A.I.* 1905. A. Vonier, *The Sacraments* (theological) and P. M. du Puy, *The Roman Pontifical* (liturgical).

Sacramentarians, those of the reformers who declined to follow Luther in his doctrine of Eucharistic consubstantiation. The first of his followers to oppose him thus was Andreas Carlstadt and the latter's party presented the Tetrapolitan Confession at Augsburg in 1530. They agreed with the Zwinglian teaching as to the sacrament. See ZWINGLIAN HERESY.

Sacramento, 1. Cap. of California, U.S.A. and co. seat of S. co. 91 m. N.E. (by rail) of San Francisco, on the 1 bank of the S. R. It possesses a fine state Capitol (1874) in a park, two cathedrals, a city hall, public library and the Crocker art gallery. Fruit canning and preserving, meat packing and rice and flour manufacturing are important industries. There are railroad repair shops and S. is an important distributing centre. Furniture and pottery are manufactured. Gold, stone oil, and natural gas are found and farming is carried on. Pop. 106,000.

2. Riv. in California, U.S.A. It rises in the N. close to Mt. Shasta, and flows in a S.W. direction to Sacramento, it drains the W. slope of Sierra Nevada, and eventually empties itself, after a course of 400 m., into San Francisco Bay. It is navigable as far as Red Bluff. The industry of salmon fishing for export in tins is a great specialty on the river.

Sacramentum, oldest form of action known to the Rom. Law. See under FURTHER TABLES.

Sacred Heart of Jesus, Feast of the, festival of the Rom. Catholic Church directed towards God's love for man symbolised in the S. H. of J. The feast is celebrated on the Friday after the octave of Corpus Christi. It arose from a vision which a French nun, Marguerite Marie Alacoque (1647-90), claimed to have received and was finally approved in 1765 by Clement XIII. In 1856 the feast was instituted by Pius IX.

Sacred Music, see ANTIHYPHYMNS, MASS MUSIC, ORATORIO, PATRISTIC, PSALMODY.

Sacrifice, commonly an act of self denial. More strictly the offering of a victim to a deity in testimony of his sovereignty. S. forms an important part of most religions. In patriarchal cultures the head of the clan or family was the correct person to offer public S., later these rights were reserved to a priestly caste while finally priests actually consecrated alone may offer S. The object sacrificed is usually something prized by its possessor and supposed to be appreciated by the deity, corn, oil, wine, incense, but, above all, living beings, birds, cattle and even human. Immolation or destruction of the victim is a consummation or a consequence of the sacrificial oblation (eating of the remnants is supposed to symbolise communion with the deity and procure benefits to come). The theory that here lies the principal origin of S. is now being abandoned. The generally accepted view is that S. is a bilateral act on the part of God and man and consists in the threefold element of oblation, immolation and communion by participation. The chief ends to which S. is offered are placation and atonement for sin, thanksgiving for past and petition for future benefits and in its highest development, pure worship of the Supreme Being. A detailed scheme of S. was incorporated in the Mosaic Law while in the N.T. the Passion is regarded as the final and supreme S. According to Catholic theology the celebration of the Eucharist (Mass) is a renewal of this and therefore S. itself. See works on primitive religion especially of Andrew Lang and Sir J. G. Frazer, also M. de la Hilla, *Myth and Ritual* 1921 and W. Schmidt, *Origin and Growth of Religion* 1931.

Sacrilege comprises the following offences: (1) breaking into any church, chapel, meeting house or other place of divine worship and committing a felony of any kind there, (2) being directly or indirectly in any such place, committing a felony and breaking out. A vestry has been held to be a 'place of divine service' for this purpose. The punishment may extend

to penal servitude for life. At common law S seems to have denoted only stealing goods out of a church or chapel. It was the only felony which deprived the offender of the privilege of sanctuary. The articles stolen need not be such as are used for divine service. In theology S is distinguished as *personal* as when violence is done to a cleric, *local*, covering the legal offences mentioned above, and *real*, e.g. abuse of the sacraments, and in the Rom. Church violation of a vow.

Sacristan, title given in the Rom. Catholic and Anglican churches to that officer who has charge of the vestry and the sacred ornaments. He performs several functions on belonging to those in minor orders. In Eng. cathedrals the S is one of the minor canons. In Rom. Catholic cathedrals and larger churches he is a priest, whilst at the Vatican the S is an Augustinian friar and a titular bishop.

Sacrum, compound bone at the base of the spine forming the back of the pelvis.

Sacrum Promontorium, ancient name of Cape St Vincent.

Saddle Origins of that part of the equipment of a horse known as the S are to be found in the F. The most primitive examples of the S generally consist of a seat and S bows. The seat covers more or less completely the back of the horse in the neighbourhood of the withers. The pommel extends in front the bows behind, each of these parts being shaped in some measure like an arc. The Gks were often in the habit of riding bareback πρὸ καὶ ἄρουρ though they also used a S which was called *ephippion*. The word passed into Rom. usage slightly altered as *ephippium*. This S of the Romans was a leather covering fastened to the middle of the back of the horse by straps on either side. The S as it is used in the Middle Ages is better known to us from examples of the war or jousting S than the S for peaceful equitation. The Ss of the sixteenth century are not very different from those in use during the fourteenth and fifteenth centuries. War Ss had their pommels covered with steel and were raised to afford the rider protection from the thrusts of weapons. As horsemanship rather than any necessity for such protective devices became the ideal of S makers the S grew less cumbersome till it approached the model in use to-day. Its balance and proportions must be very accurate if neither rider nor animal is to suffer discomfort. For Ss see under HORSES (DESAI 481-5).

Saddleback, or **Blenethra** mt of the Skiddaw group, Cumberland, England, 44 m. N.E. of Keswick. Height 2847 ft.

Saddleworth, urb. dist. in the Colne Valley part div. of the W. Riding of Yorkshire, England. It is situated on the W. of Stanedge, some 14 m. N.E. of Manchester. Cloth, woollen and cotton goods are manufactured. There are prehistoric barrows and earthworks in the dist. Pop. 16,700.

Sadducees (Gk Σαδδουκαῖοι) one of the leading Jewish sects at the time of Christ. Rabbinical tradition traces their origin to Zadok, the disciple of Antigonous Saecho,

but little credence can be attached to this. They were materialistic in teaching and represented one aspect of old Jewish thought. They denied the immortality of the soul and the existence of angels or spirits. They also rejected the Pharisaic tradition. Most of the high priests of the first century B.C. belonged to this party. After the final destruction of the temple the Ss died out. The modern Kabbalists bear some resemblance to them.

Sade, Donatien Alphonse François, Count, usually called **Marquis de** (1740-1814), Fr. writer b. in Paris. He entered the army and saw a considerable amount of service. His practices were vicious, and for an unnatural crime he was condemned to death. He escaped from prison, was re-arrested and committed to the Bastille. Here he wrote obscene and degrading novels and plays and attempted to set out a philosophical basis for his sexual practices. He died in the Châteaumatine asylum. The word 'sadism' for a sexual perversion of cruelty was added to the language by himself. See F. Dubien, *Der Marquis de Sade und seine Zeit* 1927 and I. Klossowski *Sade mon poème* 1943.

Sa de Miranda, Francisco de, see MIRA, FRANCISCO DE

Sa adī, or **Sheikh Moshli Eddin Saadi al-Shirazi** 1151 (1211) Persian poet b. at Shiraz in Persia. S. led the life of a dervish and passed his early years in wandering. In the course of these journeys he was taken by the crusaders and put to labour on the fortifications of Tripoli. He was redeemed from this slavery by a rich merchant who gave him his daughter in marriage with a dowry of 100 pieces of gold. S. died tragically in 1231. The works of S. collected by Ahmed Nasik Ben Saad consist of the *Gulistan* (Rose Garden), *Tushtan* (Jewel Garden), *Diwan* (lyrical poetry), *ghazals* (ode), *Kasidat* (or elegies), *Mahataat* (fragments), *Kubayat* (quatrains) and essays of various kinds in prose. Of all these the best known are the *Gulistan* and the *Tushtan*. Of the *Gulistan* there have been many translations. The works of S. in the Persian and Arabic were printed at Calcutta in 2 vols. (1711). See H. Misse, *Tessa sur le poète Saadi* 1911.

Sadiya, vil. of Lakhimpur dist. 1 Ben. and Assam, India, on a branch of the Brahmaputra 46 m. from Dibrugarh. Pop. 3,000.

Sadler, Michael (b. 1888), Brit. biographer, novelist and publisher, son of Sir Michael Sadler (q.v.). He was educated at Rugby and Balliol College, Oxford. He entered the publishing firm of Constable and Company (1912) of which he became a director in 1920. He is chiefly known for his commentaries on Trollope, the revival of whose novels in popular favour is due largely to S. These works are *Trollope: a Commentary* (1927, new ed. 1945), *Trollope: a Bibliography* (1928). His other chief works on literary hist. include *Bulwer and his Wife* (1931) and *Blessington D'Orsay: a Masquerade* (1933, new ed. 1947). His novels which portray the scumier side of life in Vic-

torian London, include *Lanny by Gaslight* (1940) and *Forlorn Sunset* (1947).

Sadler, Sir Michael Ernest (1861-1943), Eng. scholar and educationist *b* at Bournemouth, and educated at Rugby. He was scholar of Trinity College Oxford 1880-1884. He had a long and distinguished connection with Oxford and other univrs in England, Canada and the U.S.A. He studied and wrote authoritatively on secondary higher, and commercial education in England, Germany and Belgium while from 1893 to 1895 he was a member of the royal commission on secondary education, and from 1895 to 1903 he edited the special reports on educational subjects issued by the Board of Education and contributed many papers himself to this series. In 1903 he became prof. of the hist. and administration of education in the Victoria Univ. of Manchester, a post specially created for him, and had a most vitalising influence on education in that city. In 1911 he became chancellor of Leeds Univ. at a time when that univ. was little known. In the next decade it developed into a great institution. He was president of the commission on Calcutta Univ. 1917 and played a large part in preparing the great report on Indian education which was issued after his return. He retired in 1925 as master of Univ. College, returning in 1933. In recognition of his services to Indian education he was created K.C.S.I. in 1931. See *Memories* by his son M. Sadler (1947).

Sadler, Michael Thomas (1780-1851). Brit. social reformer *b* at Snoddon, Derbyshire, he was ardently interested in Ireland and having entered Parliament in 1829 in the Tory interest was active in his support of measures for the bettering of the condition of the working classes by Factory Acts and other legislation.

Sadler's Wells, London the theatre in Rebecca Avenue, Islington. On its site in 1683 a surveyor named Sadler discovered chalybeate wells. Previously the site had been used as long ago as Elizabethan times for entertainments, but it seems that the theatre was built by Sadler as a music house, his intention being that people might drink in agreeable surroundings, and to soft music. This music house or hall was replaced in 1760 by a theatre under the management of the comedian Thomas King, the original St. Peter Leazle. King who was (1) part proprietor and sole manager of the Bristol theatre subsequently became owner of three-fourths of S.W. which he so extended and improved that it became a place of fashionable resort. His gambling losses however compelled him to sever his connection with both theatres, and he was succeeded in S.W. by Charles Dibdin Junior as manager and owner, and the theatre concentrated on lavish aquatic spectacles. Later with the appearance of the clown Grimaldi it went back to theatrical presentations, and Samuel Phelps (between 1844-62) created a still unbroken record by producing every play contained in the first folio of Shakespeare. The theatre (which was rebuilt in 1879) then declined, but under the inspiration of

Lilian Baylis (*q.v.*) the famous Vic Wells partnership was inaugurated and the theatre was reopened in 1927. The theatre was last rebuilt in 1931, and has since then been run jointly with the Old Vic specialising in productions of opera and ballet. When the theatre closed the newly formed Council for the Encouragement of Music and the Arts arranged a tour of Great Britain for the S.W. company. From 1940 to 1943 the theatre was used as a rest centre and was reopened in June 1945. See 1. J. Dent *A Theatre for Everybody* (1941), and C. W. Beaumont, *Sadler's Wells Ballet* (1946).

Sado Island, is in the sea of Japan off the W. coast of Honshu (Honshu) 25 m. from Nagata in Honshu. There are gold and silver mines in the N.W. Aikawa is the chief settlement. Area 337 sq. m. Pop. 109,000.

Sadoletto, Jacopo (1477-1547). It. humanist and divine *b* at Modena and educated at Ferrara. He was an outstanding classical and philosophical scholar. S. became bishop of Carpentras in 1517, and Leo X. made him one of his secretaries in the same year. He was created cardinal in 1536. He made frequent efforts to reconcile the Protestants to the Church. See 1. Campaigne and K. J. Riles *Sadler's Education* 1910, and 3. Benoit *La Formation de Sadler*, *Annales de l'Institut* 1928.

Sadowa vil. of Bohemia Austria S. N.W. of Králové Hradce (Königsgrätz), scene of the battle of Königgrätz in 1864 when the Prussians defeated the Austrians. See SEVEN WEEKS WAR. Pop. 2000.

Sretabacula see ARCHAEA.

Sretabis see JAVANA.

Safad in N. Galilee Palestine 12 m. N.N.W. of Tiberies, the largest town of Galilee. An earthquake nearly destroyed it in 1837. It was surrounded by the Templars to the Egyptian Mamluks in 1266. Like Tiberies S. is a Jewish holy town which it became after the expulsion of the Jew from Spain and Portugal. It then developed as a centre for the study of the Talmud (*q.v.*) and the first printing press in Palestine was set up in S. in 1505. S. contains the remains of a Templar castle and looks out on Mt. Hermon and the N. At Melton N.W. of S. are the tombs of Hillel and other famous Jewish teachers. See further 1. F. J. SPRINGFIELD. Pop. 7000.

Safe-conduct, see PASSPORT.

Safed (Safid, Sufed, Send) **Koh** (Kuh) or **White Mountains** 1. Kuh of 1. Afghanistan extending 100 m. W. to 2. (toward Peshawar) India S. of the Kabul R. Sikauram (Sitarum) is the highest peak (15,600 ft.) 2. Range further W. following the course of the Heri Rud.

Safeguarding. The Safeguarding of Industries Act 1921 (Part I) put protective duties on key industrial products from outside the empire, and Part II provided for the imposition of duties against dumping or other unfair foreign competition, after public inquiry in the case of each industry claiming protection. 1922 saw successful applications for duties against

Ger currency depreciation in favour of fabric gloves and glove fabric domestic and illuminating glass ware domestic hollow-ware and gas mantles. In 1924 Lord Snowden allowed the duties to lapse, but the next year the Conservative Gov. with fresh committees of inquiry and new legislation gave protection to lace and embroidery cutlery, leather and fabric gloves and gas mantles, followed by wrapping paper (1926) translucent or vitrified pottery (1927) buttons and enamelled hollow ware (1928). Some of the duties lapsed before 1931-32 when general protective measures were taken. The key industries duties are still in force, and cover optical glass and optical elements, optical instruments scientific glass ware laboratory porcelain, scientific instruments, gauges and measuring instruments, etc. compounds of rare earth metals and synthetic organic chemicals etc. See PROTECTION, DUTIES also CUSTOM DUTIES.

Safety Glass, see under GLASS

Safety Lamp, see DAY LAMP

Safety Valves, see VALVES

Safflower, see CARTHAMUS

Saffron, or Crocus, *Crocus sativus* bulbous plant which has been introduced from Asia Minor to many countries of the world where it is or has been grown for commercial and ornamental purposes. The extract is now used only as a colouring and flavouring substance, but in medieval times it had great reputation as a stimulant and its production in the Low Countries was a considerable industry. It is prepared from the stigmas of the flower, about 4000 being required to make one ounce. The flowers are purple and are borne in late autumn. It belongs to the family Iridaceae. The so-called bulb is strictly speaking a corm. For meadow see COLCHICUM.

Saffron Walden, municipal bor. and mkt. town of Essex, England, 16 m. S.E. of Cambridge and 46 m. N.E. of London. Its church the largest in Essex is a fine example of fifteenth century work though the tall spire is modern. The museum was built in 1884 and houses an important collection of local and other antiquities. Close by are the remains of a Norman keep. There are many old houses, one of the most interesting being the Sun Inn now it is cottages with its curious plaster front. It was the headquarters of Cromwell and Fairfax in 1647. The grammar school was endowed in 1425 and re-established by Edward VI. The town takes its name from the saffron crocus which was once cultivated here. The Guild of Our Lady of Pity, one of whose main objects was the foundation and management of an almshouse for thirteen inmates, was granted a royal charter in 1400. In 1414 Henry VIII replaced this by a charter giving wider powers to the Guild of the Holy Trinity, renewed by Edward VI in 1550, by James II in 1685, and by William and Mary in 1694. About 1 m. from S.W. is Audley End, a property including 100 ac. of parkland and gardens, together with a sixteenth-century house, enlarged in the reign of James I.,

which takes its name from Sir Thomas Audley, Speaker of the Commons from 1529 to 1532, and later lord chancellor, to whom in 1538 Henry VIII granted the manor of Walden. This property was purchased from Lord Braybrooke by the Ministry of Works in 1918 for preservation as an ancient monument. There was formerly an abbey (founded c. 1130) near the house but probably no part of it survives. Apart from the beauty and dignity of its exterior Audley End, as it now exists, has many striking internal features. Pop. 7000. See 1. Addison 1932c *Hedgday*, 1948.



THE TOWN HALL SAFFRON WALDEN

Safi, or Asfi, seaport of Morocco on the Atlantic coast 10 m. W.N.W. of Morocco City. It was fortified and held by the Portuguese until 1611. It exports maize, almonds, wool, goat hair and skins, and imports sugar, candles and provisions. Pop. 78,000 (2500 Europeans).

Safleiben, Cornelis, see SACHSELIJEN

Saga (plural *sogur*, in Icelandic word meaning both story and history). In the early Middle Ages the literature society of Scandinavia recognized among the accomplishments of a gentleman (*idrottir*) the ability to narrate a story accurately and entertainingly together with decent familiarity with the poetic arts (see also SKALDS and SKALDIC POETRY). This faculty was still cultivated in the isolated commonwealth of Icelandic farmers and fishermen long after it had ceased to resemble a continental aristocracy. The earliest named author whose work survives is Ari Thorgeirsson the Learned (d. 1149), his *Islendingabók*, like *Landnám*

book written down about the same date, is essentially a nominal roll of the 'four hundred families' who were the original settlers of Iceland, their provenance, and the site of their estates. From this period (back to 874 and forward to about 1040) date a great mass of S. of Icelanders of varying length and anonymous authorship, probably all committed to writing by about 1200. To this group belong the most famous tales such as *Lyrbyggja*, *Lazdaða*, *Njáls Saga*. Of similar form and antiquity are *Kareyingsaga* and the *Saga of Ivar the Red* (the story of the Greenland settlements).

No distinction is made between history and biography, and a group of historical S. comprises chiefly *Ólafs saga* and *Heimskringla*, the latter the compilation of Snorri (q.v.) Sturluson. A series of lives of bishops (*biskupa sögur*) cover the period 1100-1331. The greatest of the later family S. is *Sturlunga saga*, a compilation based on the Icelandic *Saga* of Sturla Thordsson (q.v.) nephew of Snorri the historian. After 1380, though the name and something of the external form of the S. continues to be used, the matter consists either of lives of saints imported from Britain, Germany, and Ireland, or thinly disguised romance, or prose retellings of Greek legends, some not now extant in their earlier form (eg *Lofsungasaga*).

Printed texts in Icelandic are available for nearly all the extant S. (see hundreds), a large number have been rendered into German (Thule series, Jena). The Rolls series, ed. by C. V. G. Jensen and Sir C. D. Bant, prints English versions of S. relating to the history of Britain. There is a list of texts and translations in *Heimskringla Sagas of the Norse Kings*, trans. by S. Laing (Faber in S. Library, N. 547). See B. Philpotts *Edla and Sævi* 1951 and W. A. Craigie *The Icelandic Sagas* 1951.

Sagaing 1. Ancient city of Burma in a div. of the same name on the Irrawaddy opposite Ava and 10 m. W. S. W. of Mandalay. It was captured by the Brit. Fourteenth Army under Lt. Gen. Slim during the battle of Mandalay, when the city was taken from the Jap. in March 1945. Pop. 15,000. 2. The div. has an area of 26,152 sq. m., and grows large crops of rice, sesame, millet, peas, and cotton. Pop. 2,323,000.

Sagan, see *ZAGAN*.

Sagar, or **Saugor** 1. Is. at the mouth of the Hugli R. Bengal, India. The Hindus regard it as sacred and it is much visited by pilgrims. Area 22 sq. m. 2. District of Sagar dist. (400 sq. m.) Central Prov. India, 90 m. N. E. of Bhopal, on Sagai Lake (altitude 1940 ft.). It has a fort, barracks, and a large park. Salt, sugar, and cloth are exported. Pop. 14,800.

Sage, dwarf evergreen plant of the genus *Salvia* and order Labiales, bearing blue flowers. It is grown as a pot herb, requiring a light rather dry soil. *S. officinalis* or garden S. is used in cookery as a flavouring agent, and *S. terbenaca* or herb clary as a flavouring ingredient in

liquors. The essential oil from *S. officinalis* is used in perfumery. *S. tica* is a medicinal infusion of S. leaves.

Sage-brush, *Artemisia tridentata*, growth of alkali plants which cover some thousands of sq. m. of sterile dists. of the U.S.A. especially Nevada and Utah. Nevada on the account has long been nicknamed 'the sage brush' state. See also *SAGE* (q.v.).

Sage Grouse, or **Hen** (*Centrocercus urophasianus*) large grouse which inhabits the sage brush dist. of the W. U.S.A. It has soft dense plumage, is mottled yellowish brown in colour, with a long, twenty feathered tail. At each side of the male's neck is an inflatable air sac, distended during the mating season.

Saghalien, see *SAKHALIN*.

Saginaw, co. seat of S. co., Michigan, U.S.A. on the S. R. 16 m. from the mouth. S. has many industries including the manu. of automobiles and automobile parts, machinery, railroad shop products, radio cabinets and other furniture, and phonographs. Dairying is carried on. It is noted for bituminous coal and beet sugar industries, and also has salt mines and oil wells. Pop. 52,800.

Saginaw Bay, W. inlet (60 m. long, 25 m. extreme breadth) of Lake Huron off the coast of Michigan, U.S.A.

Sagittarius (Archer) 1. zodiacal constellation (the ninth in order) representing a centaur drawing a bow. Many novae (q.v.) and planetary nebulae have been discovered in S. star clusters are numerous in the direction of this constellation and faint stars are very crowded in this region, as are also cepheids (q.v.). It is believed that in this region the mass centre of our galaxy lies, the sun being about 30,000 light years from this centre.

Sago, starchy food obtained from the soft inner portion of the S. palm (*Metrosylon Rumphii*) and other trees. The trunks are cut into sections and split the soft centre being removed and pounded in water till the starch separates.

Sagrara, Guillen (d. 1456) Sp. Gothic architect. The strength and clarity of his lines makes his work distinctive. His masterpiece, in which his son Francisco co-operated, is the cathedral of Palma de Majorca (begun in 1420).

Saguache, see *SAN JUAN*.

Saguenay, riv. drains the shallow Lake St. John famous for its salmon and running for 100 m. N. E. into the St. Lawrence at a point 115 m. N. E. of Quebec, Canada. In its upper reaches it threads through hilly country whilst further down, gaint chs. often 1600 ft. high confine its bed. From La Ha Bay a favourite summer resort the riv. is open to draft of all sizes. Father DuRoi, S.J. was the first white man to ascend the S. to Lake St. John in 1617, and T. Doucette, a 11 Canadian, did at the mouth of the S. has, since the seventeenth century, been the headquarters of the Jesuit and Franciscan missions. See W. H. Harris, *The Cross-seekers of the Saguenay*, 1920.

Sagunto, or **Murvielro**, modern name of **Saguntum**. It is situated in the prov.

and 20 m N of the city of Valencia Spain. In 219 B.C. it offered an heroic though ineffectual resistance to Hannibal. Under the empire it flourished as a romanised native tn, and many Roman ruins remain. The walls were strengthened in 1812. In 1874 it was the scene of the pronunciamiento which restored Alfonso XII to the throne of Spain. Pop. about 11,400.

Sahara (properly *Sahra*, 'wilderness'), largest desert of the world covering about 3,500,000 sq. m. of N. Africa from the Mediterranean southward to the Sudan and from the Atlantic eastward to the Red Sea. Yet the actual waste land even including the Libyan and Nubian deserts is not 2,400,000 sq. m. The Sahara is an elevated plateau with a mean altitude of

the wind into high dunes continually shifting and changing contour. Oases occur wherever there is water and these tropical fruit trees, palms and cereals grow in plenty. The oases of Ghadames, through which pass the caravans from Morocco to Cairo is due to a natural spring; certain oases in Fezzan and Algeria are caused by underground reservoirs reached by means of artesian wells whilst those of the wadi Draa depend on the waters brought from the Atlas Mts. Ancient watercourses prove that rivers formerly flowed through the desert and the presence of salt (salt is the currency of the Sahara) and of marine shells proves that parts of it were once under the sea. That the process of drying up is still continuing



IN THE SAHARA DESERT

L N 1

1,000 ft. and practically never sinks below sea level; the *hafras* (hollows) of Fezzan and Fuzerbo in the N.E. etc. being only relative depressions. Its surface is diversified by lofty tablelands and mts., the summits of the central Ahaggar highlands and of the Tibesti mts. further to the E. rise as high as 8,000 ft. and are snow-capped for six months of the year whilst to the N.E. and N.W. of the Ahaggar peaks extends the ridge of the Moudir plateau (200 m. and that of the Tash of the Asjer (300 m.), which has one in altitude of 4,000 ft. S. of the Ahaggar are the mts. of Air (6,000 ft.). The Igil which with the W. and E. Erg stretches from Cape Blanco to the S. of Timisi (1,300 m.) is a vast belt of sand hills. But these do not account for more than a ninth of the Sahara. The Hammada el Homra and the hammada of Murzuk etc. are vast, undulating granite strewn surfaces, and there are also interminable tracts of stones and water-worn pebbles called *serir*. Other areas, e.g. the Libyan desert, are covered in soft sand, sometimes blown by

is shown by the presence of deserted or semi-deserted cities, e.g. Agades and Tadmah and of deserted caravan routes and by the fact that cities inhabited fifty years ago are now deserted. In the past 1,300 years vast tracts of N. Africa have become desert. Man and beast (i.e. the nomad and his goat) are to a great measure responsible for burning shrubs and tree for firewood and the beast by eating young vegetation. Before the Second World War the I.T.S. had reclaimed large tracts of desert in their N. African colonies since the war with the encouragement of U.N.O. work has continued especially by the F.R. authorities on an increasing scale.

The S. interior districts have the highest temps. of Africa, if not of the world, after noon temps. may exceed 120° in summer, but in winter (Dec. Jan.) the mean in most districts of the interior is below 60°. Frosts are not unusual in mid-winter. Offshore from the W. Sahara cold surface water has a modifying influence on the normal desert climate, and the high levels

of the thermometer in the interior are never approached in the coastal regions of W Africa or Libya, and usually the mean of each month of the year is lower than 70° while fogs are of frequent occurrence. Though more or less rainless the Sahara as seen above is not without subterranean water, and the wells of the oases e.g. those of the Tuat group in the N central Sahara are conducive to agric. wealth. This wealth, combined with the nodal position of the oases on lines of trans-Saharan communication, gave them considerable economic and commercial significance. Saharan scenery varies widely according to the character of the surface rocks and the action of frost and wind or other erosive agents. Generally there is a very meagre and sporadic vegetation of stunted shrubs but as this plant life is not perceptible at a distance the landscape appears to be uniformly barren. Here and there in the sandy wastes or *ergs* occur small shrubs including the *Salm* in bloom and tufts of very harsh grass, but vast stretches of these wastes are devoid of all vegetation. The most extended area of unmitigated sandy waste is the Libyan desert which stretches southwards for 800 m from the Swah group of oases. The *erg* or sandy waste is avoided by caravans which keep to rocky or gravel desert as far as possible and where subterranean water and camel pasture are more abundant though always very rare. Rocky wastes with the bare exposure of fissured rocks as dominant features of the scene form the *hammada* type of the Sahara. Much of the central plateau of Ahaggar and Tibesti is of this character. Numerous shrubs of different kinds find shelter in the clefts resulting from radiation and isolation, and here too may be found rough camel pasture. Merchants cross the desert by camel caravan along recognised tracks which naturally follow the oases. Timber-trees communicate by beaten ways with Morocco, Tunisia, Tripoli and Algeria; part of the distance by motor route and Tripoli is also connected with Kano, Zinder and Kuka (Lake Chad). The caravan traffic has long been declining in commercial importance partly because the economic resources of the Sudan have been tapped at many points and diverted by roads and railways to ports on the gulf of Guinea. But some of the more important caravan tracks are still used. Numerous railway plans have been suggested and there are now in routes across Sahara and emergency landing grounds have been made. Sav. explorers have risked their lives and many have lost them in the Sahara. Among Eng. explorers Maj. Timg who crossed S to Timbuctoo 1826, John Davidson 1836 and John Richardson, 1843 may be mentioned; there was also the ill-fated expedition led by Col. Flatters 1881. Notable achievements of recent years are those of Capt. A. Buchanan who travelled from Kano to Tuggurt by camel caravan 1922, B. Khun de Trobok who between 1920 and 1940 made sev. motor expeditions, the Citroën expeditions which have crossed the Sahara by motor from N to S,

and Gen. Laperrine who lost his life in an attempt to fly the desert in 1919. In Jan. 1913 Gen. Léclerc led a mixed Fr. and native army across the Sahara from Fort Lamy to conquer Kozzan prov. (1500 m) and to aid the Brit. to drive the Gers from Tripolitania and Tunisia. Some railways have been built in the N by the Fr., and a trans-Saharan railway is projected. Politically three fifths of the Sahara belongs to the Fr. the rest to Britain, Italy, and Spain. The sporadic pop. of some 2,000,000 includes Moors, Tuaregs, Negroes, Bedouins and Tibbus.

See G. Nachtigal *Sahara and Sudan*, 1879; Rosita Forbes *Kufara: the Secret of the Sahara*, 1921; A. Buchanan *Sahara*, 1926; I. C. Gauthier, *Le Sahara*, 1928; B. Khun de Trobok *Mysterious Sahara*, 1930; I. W. Boyd *Caravans of the Old Sahara*, 1933; P. Turnbull *Sahara*, 1940; R. V. C. Bodley *Wind in the Sahara*, 1917; and P. F. Fetherston *Across the Great Deserts*, 1948.

Saharandpur, see SERAMITR.

Said al-Fayyumi, see SAID AL-BIN JOSTAN.

Saigon, cap. and prin. seaport of the autonomous prov. of Cochinchina of the independent state of Viet Nam within the Fr. Union on the S 34 m from the sea. With the neighbouring city of Cholon it has sev. rice mills and soap factories, some saw mills, and a yarn-spinning factory. It is at the head of two of the prin. railways of Indo-China. S. has sev. bank agencies and is important as a port. S. is connected by rail with Cholon, a native commercial city. In July 1941 the Vichy Gov. gave Japan permission to occupy a number of ports on the coast and inland in Indo-China, and to exercise various forms of control within the country. On Oct. 5, 1941 the Japs seized the warehouses at S. and thereby made it clear that they intended to use Indo-China as a base for further aggression. After the collapse of the Jap resistance in 1945 the Annamese broke out into revolt against the Fr. at S. Pop. 214,000. The outcome of the revolt was the creation of the state of Viet Nam (1945).

Sails and Rigging. The term rigging, in the strict sense, includes all the appliances by which a sailing vessel is enabled to make her way through the water. Masts, yards, sails, and cordage are thus comprised as are also the davits on which the boats are slung. It is the difference in rigging which determines the classification of a vessel and the various types such as schooner, barque, ship, etc. are schooner, rigged, barque, rigged, etc. vessels. The various kinds of rig are multitudinous; there are however two main classes: (a) square-rigged, that is having yards slung and the prin. sail set across the length of the vessel, and (b) fore and aft rigged, that is having the S stretched along the line of the keel and hence the spars appertaining to them—masts and booms, pivoted on to and abaft the mast. Many (e.g. the topsail schooner) combine the two rigs. A few fundamental types may be given. The simplest form

SHIPS AND SHIPBUILDING CRIPPER, YACHT See R. Kipping *Sail and Sail making* 1864, R. H. Dana *The Seaman's Manual*, 1867, G. S. Norris, *Seamanship* 1897, P. K. Kompt *Sailing* 1938, and A. de Seincourt, *Sailing a Guide for Livelyman* 1949.

Sarma, Lake, see KINLAND

Sainfoin (*Onobrychis sativa*) handsome perennial leguminous plant bearing rosy red flowers in axillary racemes. It is a valuable fodder plant on dry, calcareous soil and makes excellent hay. It is allowed to occupy the land for three to seven years, but afterwards the land must have a long rest from it.

Saint, or **St** 1 or individual **ss** see under the first letter of their names.

Saint (Lat. *sanctus* O.I. *sancti*) Though St. Paul uses the word *ay* or 'saints' in addressing the Christian congregations to which he writes the name is to day used in a more restricted sense. A **S** in this meaning is a person remarkable for special holiness and piety. Veneration for such persons is not a peculiarity of the Christian religion, but has been a feature of it from the beginning. Such recognition of special holiness was not at first marked by judicial procedure. The holy man was famed in his own district. His *deeds* and memory was venerated and perhaps miracles were worked at the place where his body rested. Sometimes his fame spread far and wide. There was thus a considerable possibility of error and scandals led to a restriction of the right of canonisation to the bishop of the diocese. For the elaborate modern procedure of canonisation see **BENEDICTION CANONISATION**. See the compilation of the Benedictine monks of St. Augustine's Abbey, Ramsey, *The Book of Saints* 5th ed. 1947. The most comprehensive collection is that by E. G. Holbock, *A Biographical Dictionary of the Saints* 1921.

St. Abb's Head promontory with a lighthouse on the N. coast of Berwickshire, Scotland 4 m. N.W. of Lynton. It is named after St. Abb, who found a monastery there in the seventh century.

St. Affrique, in the dept. of Aveyron, France 6 m. N.W. of Montpellier, noted for Roquefort cheese and the dolmen at Liergues. Pop. 4000.

St. Agnes 1. Former seaport, now holiday resort on the Bristol Channel with old town 9 m. N.W. of Llandovery, Cornwall, England. Pop. 4000. 2. One of the inhabited Scilly Is. Area 313 ac. Pop. 39.

St. Aignau Island, see under LOUISIADY ARCHIPELAGO.

St. Albans, Viscount see **BACON FRANCIS**.

St. Albans Since 1877 city in the seat of a bishop 20 m. N.W. of London in Hertfordshire, England. The chief industries are printing, engineering, hosiery, clothing, and ornamental culture. It was the successor to the important Roman Briton of Verulamium (q.v.). The place name is derived from the martyrdom in 303 of St. Alban, the Roman soldier convert and the first Christian martyr in England.

Offa king of Mercia is said to have rediscovered the coffin containing his bones. The Benedictine abbey, founded by Offa in honour of the saint, c. 793, and the medieval town arose on the opposite side of the valley from the Roman town of Verulamium, that being the spot to which, according to tradition, the body of St. Alban had been removed for safety. From Matthew Paris (d. 1253) the historian monk of St. A. we learn of the benefactions of Abbot Wulstan or Ulstan who founded (c. 900) the three par churches, St. Peter's, St. Michael's and St. Stephen's, the abbey school from which the present grammar school claims direct succession and the market. St. Michael's church, which stands on part of the site of the forum of Verulamium, contains a monument of Rufus Bacon (Baron Verulam and Viscount St. Albans) (d. 1626). Near by are the impressive remains of the Roman theatre. The abbey church, the present cathedral, has the longest Gothic nave in Europe. The tower, built of thin Roman bricks taken from the ruined buildings of Verulamium. The Saxon church was rebuilt at the end of the eleventh century by Eadulf of Caen, the first Norman abbot, whose Norman work is among the earliest in the country. In contrast to the massive unadorned forms of the Norman arches, the presbytery with its delicate late Gothic tracery and Abbot Hamlyn's (d. 1520) chantry chapel. Further eastwards are afforded by the nave arcades of various periods, and owing to its great length the nave gains rather than loses from the piecemeal rebuilding. The series of wall paintings on the W. and S. sides of the Norman pier in the N. arcade of the nave belong in part to the time of Walter of Colchester, sacrist 1214-48 and Matthew Paris. The abbey soon became a famous centre of culture. In the abbey are the tombs of Humphrey, duke of Gloucester (d. 1447) and an inscription to Sir John Mandville. The abbey, patches of stone and flint was built about 1550, supposedly from the designs of Henry VIII, the king's master mason. Since 1871 it has formed part of the buildings of the grammar school for the previous 300 years housed in the July chapel of the abbey. The school was refounded in 1545 by Richard Bannum. Among its pupils were Alexander Neckham, foster-father of Richard Coeur de Lion, Matthew Paris, and possibly Nicholas Breake and Sir John Mandville. The abbey and St. Michael's and St. Peter's churches suffered restoration and alterations by Edmund Beckett, afterwards Lord Grimthorpe. The market stall by Wulstan is still held in the market place near the abbey. In spite of modern shop fronts and some rebuilding some old houses still survive near the clock tower which has dominated the scene for more than 500 years. In 1877 the abbey church was raised to cathedral status in the formation of the new diocese, though it is still widely known as the abbey. Pop. 42,100. See F. Gibbs *Historical Records of St. Albans*, 1885 and L. F.

Rushbrooke Williams, *History of the Abbey of St Albans* 1917

St. Albans, cap of Brankhu co, Vermont, 1 S A 300 ft above and 3 m L of Lake Champlain. It is a centre for dairy produce and also has railroad-car shops, foundries, and cigar factories. It is a summer resort. Pop 8000

St. Alban's Head, promontory on the Eng channel 5 m from Swanage. There is a Norman chapel dedicated to St. Adhelm, the present name of the headland being a corruption of Adhelm.

St. Aldwyn, Michael Edward Hicks-Beach, first Earl (1837-1916) British statesman. He was educated at Eton and Christ Church Oxford. In 1861 he became M P for Gloucestershire and in 1885 M P for W. Bristol. He was twice appointed chief secretary for Ireland, then secretary for the colonies and was chancellor of the exchequer 1885-86, and again from 1895 to 1902 when he resigned on account of his views on free trade. He was raised to the peerage in 1906 and in 1916 made an earl. His life was pub in 1912.

St. Amand-les-Eaux, tn with hot sulphur springs, 5 m N W of Valenciennes, in the dept of Nord France. Pop 14,200

St. Amand-Mont-Rond, tn with Roman antiquities 3 1/2 m S L of Bourges by rail in the dept of Cher France. Pop 1900

St. Andrews, seaport and royal burgh, 12 m S S L of Dundee by rail on St. A Bay, Fife-shire, Scotland. Legend claims that the tn was so called because it harboured the relics of St. Andrew, which a certain bishop named St. Regulus or Rulic, brought hither from Pictus in Achaea. There are ruins of the castle (built 1200).

A fragment of wall and some archways are the only remains of the wealthy Augustinian priory which Bishop Robert founded here in 1114. The cathedral which still contains some specimens of Norman and Early Eng architecture was consecrated in 1118 in the presence of Robert Bruce, and in 1550 suffered from an outburst of iconoclasm stimulated by Knox's sermon in the par church. A bishopric it is said in the ninth century, St. A was in 1526 accounted one of the six 'principale towns of merchandise of this realm' and numbered 14,000 citizens, including merchants from France and Flanders.

Yet when De Witt saw the city it was a scene of desolation with many homes deserted. It is a fashionable and healthy watering place, but the fame of St. A today depends on its university, the most venerable in Scotland (1411) and on its splendid golf links (acquired in 1894), which rank with the best in the world. The golf club was instituted in 1754 and took the title Royal and Ancient by the wish of King William IV. It is the governing power in golf, and drew up the original rules of the game. There are four courses, the Old, New, Eden and Jubilee. Pop 8700

St. Andrews University, Fife-shire, was founded in 1411 by Henry Wardlaw (d. 1440), who was consecrated bishop of St. Andrews in 1403. The colleges of St.

Salvator and St. Leonard, founded in 1496 and 1512 respectively, were in 1747 formed into the United College of the Univ. Univ. College, Dundee, founded in 1880, and the college of St. Mary (founded 1337, now theological) are part of the Univ., as also is the conjoint medical school, Dundee. The number of students enrolled (1950) was 2196.

St. Anne 1. In on the W shores of St. A Bay Cape Briton is (Canada). 2. Settlement on the R. Seine in Manitoba, Canada, connected by rail with Winnipeg, 33 m to the N W.

St. Annes-on-Sea, seaside resort 4 m S of Blackpool in Lancashire, England, now joined to Lytham to form Lytham St. A municipal bor. Pop (bor.) 30,000

St. Anne's Point, see LEBANON

St. Anne's Society, body of non-collegiate women members of Oxford Univ., organized in a number of hostels, etc. It has its own principal fellows and tutors in scholarships and exhibitions are offered. St. A S grew from the Society of Home Students and dates back to 1879. In 1916-17 over one quarter of the women undergraduates in residence at Oxford were members of St. A S.

St. Ann's Bay, bay in Middlesex, Jamaica. It is famous as the reputed landing of Columbus on May 3 1494. It is the Santa Clara of Columbus, and not far away he ran his caravels ashore on June 21 1493 staying till June 28, 1494. A fort was built there in 1777.

St. Anthony Falls on the Mississippi R. near Minneapolis, Minn. Falls U.S.A. They furnish 40,000 h.p. for Minneapolis.

St. Anthony's Fire, see SKIN DISEASES

Saint Arnud Jacques Leroy de (1801-1841). The soldier, he obliterated the memory of his early debaucheries and debts by his valour as captain in Algeria. From 1831 till his death he was warden minister. He was commander in chief of the 1st forces in the Crimea (1854) and was present at the battle of the Alma.

St. Arnaud 1. Mining town near quartz mines in Koroitico, Victoria, Australia. Pop 4100. 2. In connected by rail with Seattle to the W. in the dept of Constantine, Algeria. Pop 8300.

St. Asaph, rural dist. par and tn in Flintshire, Wales, on N by W of Denbigh, situated on an eminence between the Clwyd and the Elwy R's. The tn and diocese take their name from St. A (9th), the successor of Kentigern, who is said to have founded the see about 560. There are still a few parts of the cathedral dating from the thirteenth century, but most of it belongs to the fifteenth century. It was restored under the direction of Sir Gilbert Scott. There is a grammar school, a par church and in old bridge across the P. Elwy. St. A is in the centre of an agri. dist. The area of the par is 164 sq. ac. dist. 22,300 ac. Pop par about 2000, rural dist 8,000.

St. Aubin small picturesque tn in the par of St. Brelade, Jersey, at the W. end of St. Helier Bay. It has a small, but convenient harbour, a pier, and a market-place, and the view from the adjacent point, Noirmont, is exceedingly fine.

St Augustine, city in St John co Florida U S A lies 2 m distant from the coast. It is said to be the oldest town in the U S A having been settled by Spaniards in Sept 1565. There are cigar artificial flowers, and engineering factories. Most of the houses and hotels are built of the local coquina rock. St A is a famous health and winter resort and fruit growing centre, while pine and cypress locally grown are the important timber. Pop 12 000.

St Austell, market town and par in Cornwall England. The town is 13 m S of Truro. There is a beautiful early Long church which has a particularly fine Perpendicular tower. St A was formerly the centre of a tin and copper mining district. There are important china clay works here and large quantities of china stone are quarried in the district. Part of the pull army under the earl of Essex was quartered here during the Civil war shortly before the capture of Charles I in 1644. Pop 21 900.

St Bartholomew or St Barthelemy, is of the Fr W Indies lying between St Martin and St Kitts. Its 8 sq m are very mountainous and its soil despite its parched nature is not infertile. The island is volcanic and the rocks are red and dangerous. Banana, guinea, and citrus fruits are grown for export and sugar cane and maize are also produced. The capital is Gustavia near the port which is not very accessible. The island was first settled by a colony of Frenchmen from St Kitts in 1648. In 1680 it was taken by the Eng under Adm. Thornhill and remained in Eng possession till the peace of 1697 when it was restored to France. In 1746 it again fell to the Eng and was once again given up under the treaty of Aix la Chapelle 1748. In 1785 it was ceded by the Fr to Sweden and continued subject to that country until 1878 when it was purchased by France for £11 000. Pop 2 000.

St Bartholomew, Massacre of See BARTHOLOMEW MASSACRE OF ST.

St Bees, par in Cumberland 4 m S of Whitehaven. St Bees is a lush princess from whom the name is derived is said to have founded a nunnery here about A.D. 650. The church belonged to a Benedictine abbey in the twelfth century. A grammar school was founded here by Archbishop Gundulf in the sixteenth century under royal charter. Pop 1 200.

St Benoît, town on the N.E. coast of the is. of Reunion or Bourbon 19 m S.E. of St Denis connected by coast railway with Pointe des Galets. Pop 13 000.

St Benoît-sur-Loire, town in the dept of Loiret France. It was once the site of the abbey of Fleury belonging to the Benedictine order. Pop 800.

St Bernard, name of two passes across the Alps. The Great St Bernard (8111 ft high 53 m long) leads from Martigny in Valais Switzerland, to Aosta in Italy, across the Pennine Alps. The Little St Bernard (7179 ft high, 39 m long) from the Isère valley Savoy France to Aosta across the Graian Alps. The first pass, Alpis Poenina, seems to have been opened

in 57 A.C. by Servius Galba for Julius Caesar, but the road, of which there are slight remains was not made till much later. It was in existence by A.D. 69. At the top of the pass was a temple to Jupiter. The famous hospice was founded or as some say refounded by St B. of Menthon (d.c. 1041) and has been served by Austin monks since the end of the twelfth century. The monks serve in saving life with the aid of their dogs has become historical (see also next article). Napoleon and his army crossed the Great St Bernard Italy in 1800. The construction of a carriage road was not completed till 1905. The hospice was badly damaged during the Second World War. In 1944 under the terms of the peace treaty with Italy the hospice was handed over to the Fr. The Little St B. known to the Romans as Alpis Graia was the chief pass till the opening of the pass at Mont Genèvre Alpis Catin. But the road in A.D. 3 traces of the Roman road still remain. Humboldt's crossing the Alps by this pass is disputed. The hospice was also founded by St B.

St Bernard Dog huge powerful picturesque and dignified dog which originated in a breed in the Augustinian hospital at the summit of the St Bernard Pass through the Alps where it was used to act as a guide and to search for and aid travellers who had lost their way. Two varieties are bred in Britain the rough coated and the smooth coated. The



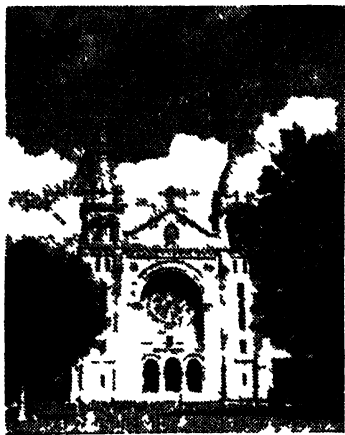
ST. BERNARD DOG

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colour of both is orange tawny and various shades of brindle and red with white markings on the muzzle face neck chest legs and tip of tail. The head is large and massive with rather short face and deep wide and square muzzle. The lips are loose, and the stop well defined. The eyes are dark and the lower eyelid droops a little to show the red haw. The ears are of medium size and are carried close to the cheek. The back is level as far as the haunches and rises slightly over the loins. The legs are straight fairly long and powerful and the feet large and compact. The height of a dog at the shoulder averages about 34 in and the weight 200 lb. Size is an important characteristic of the breed.

St. Blazey, mrkt tn and par of Cornwall, England, 8 m S of Bodmin. It is engaged in the china clay industry. Pop. 3000.

St. Boniface, tn in Manitoba, Canada, on the Red R. 10 m S.E. of Winnipeg, of which it is virtually a suburb. It is a



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THE CATHEDRAL, ST. BONIFACE

Rom Catholic archepiscopal see. St. B. manufactures steel and has flour mill and laboratories. The dist. is agrie and brick clay pits occur. Much damage was done by riv floods in May 1900. Pop. 18,200.

St. Bride's, or **S. Bridget's**, church of the city of London situated on the S. side of Fleet Street. It was rebuilt by Wren in 1680, after the fire of London (1666). It was one of those left in ruins in the air raids of 1940, and only its tall steeple remains. It is one of the churches recommended by the Bishop of London's commission for restoration. See LONDON, Bomb-damaged London.

St. Briouac, tn on St. L. R. in the dept of Calvados du Nord, France, 7 m W. S. W. of St. Miho. Amongst its hist. buildings are a cathedral of thirteenth century, workshop, a pilus, a justice and an eccles. college. There is iron and steel works. Agric. implements and shoes are manufactured. Pop. 3670.

St. Catharines, co. tn of Lincoln Ontario, Canada 4 m S. of L. Ontario and 12 m N. W. of Niagara Falls. It is situated in a prosperous port and is a growing dist. There are sea, fine parks with bathing beaches on Lake Ontario a few miles distant. It has a new city hall, a hospital and public library. There are some twenty schools as well as a collegiate vocational instn, a business college and Bishop Ridley College on the Eng. public school model. The Canadian Henley regatta is held here on the disused canal. There is an airport. Among a

hundred industrial plants are those producing broadsilk and other silk goods, hair cloth, knitted woollen goods, rugs, agric. implements, harness, chains, lumbering tools, dynamos, transformers, electrical apparatus, motors, saws, drop forgings, castings, paper, wood products, canned fruit and vegetable products, wines and jams, meat products, and macaroni. The city was founded late in the eighteenth century by United Empire Loyalists from the U.S.A. The young community received its first impetus in 1826 with the construction of the Welland Canal from Lake Ontario to Lake Erie. Now the great new Welland Ship Canal makes St. C. a busy inland port. Pop. 35,000.

St. Catherine's Society, body of Oxford Univ. consisting of students who while members of the univ. lodge in the city. Such bodies were made possible by a relaxation of the univ. statutes in 1565. The head of St. C. is the censor. St. C. also has a number of lecturers and a dean, and offers scholarships. New buildings were opened in St. Aldate's in 1936.

St. Chamond, tn on the R. Clermont in dept. Loire, France. Its prin. manufs. include silk braid, laces and wire tools. It has deposits of coal and iron and has naval and railway workshops. Pop. 14,800.

St. Charles, tn in St. C. Co. Missouri, U.S.A., with a fine iron bridge spanning the Missouri. The Underwood College for Women is here. There are manufs. of cast steel dies, oil engines, electrical supplies and shoes. Pop. 12,000.

St. Christopher, one of the Brit. W. India is usually called St. Kitts (71).

St. Clair, 1 Riv. discharging into Lake Michigan from St. C. Co. Michigan, U.S.A. It issues from Lake Huron and flows a distance of 41 m, gathering on its course the surplus waters of lakes Superior, Michigan, and Huron, which it discharges into Lake St. C. Thus Lake St. Clair is situated in Michigan and the prov. of Ontario discharges into the L. Detroit and thence into Lake Erie. Length 30 m, breadth 25 m.

St. Claude, tn in the dept. of Jura, France, with a fine cathedral church of fourteenth century. Workshop. Its industries are the manuf. of toys and brass pipe and iron cutting. St. C. is one of the tourist centres of the Jura. The Benedictine convent was founded in 1710. A great fire occurred in 1799 and a hurricane ravaged the tn in 1800. Pop. 10,700.

St. Clement Danes, par. of London which contains a church in which Dr. Samuel Johnson used to worship. Wren's church built in 1681 was probably the third church on the site. It was this building which, with the exception of the tower, was destroyed during German raids in 1940.

St. Cloud, 1. Rn in the dept. of Seine-et-Oise, France, on the l.b. of the Seine, 6 m from Notre Dame Paris. It is a tn. rich in historical associations, with the ruins of a castle once inhabited by Marie Antoinette. The celebrated Service factories stands in the park. Pop. 17,600. 2. Rn on the Mississippi in Minnesota, U.S.A., 60 m N.W. of Minneapolis, with granite memorial and building stone in-

dustries and numerous manufs of freight cars and motor parts paper and canned vegetables St Johns Univ is here Pop 24,200

St. Columba, College of, Dublin, founded in 1849 by Wm Sewell, an Oxford don in sympathy with the High Church Oxford movement, who visited Ireland in 1840 and planned the establishment of a college not only to supply an Irish speaking clergy, but to give the Irish landlords, nobility, and gentry a knowledge of the Irish language and literature and an interest in Ireland. His plans were accepted by his associates, who included some Munster landlords, and liberally supported by Lord John Balford, archbishop of Armagh. The college was actually founded in 1853 on the banks of the Boyne but moved in 1849 to the foot of Kilmashogue. To day the college is used by the professional classes, including the farmers for whose benefit it offers special facilities to boys who want an education with an agricultural bias.

St. Croix, name of two rivers in N. America. One rises in the Penokee mts., and after separating Wisconsin from Minnesota for 135 m flows into the Mississippi 20 m below St. Paul. The other flows out of Great Slave Lake and finally reaches Pissumanguod Bay between Maine and New Brunswick. Length 75 m. See also SANTA CRUZ.

St. Cyran, Jean du Vergier de Hauranne, Abbe de (1571-1633) Fr. Jansenist theologian b. at Bayonne. Studied theology at Louvain Univ. being a contemporary there with Jansen whose intimate and lifelong friend he became. In 1611 he was given the canonry of Bayonne and in 1620 the abbacy of St. Cyran. Imprisoned by Richelieu in 1638 he was released in 1642. To day he is regarded with Jansen as the co-founder of Jansenism and the strongest for its in the dissemination of its doctrine.

St. Cyr-l'Ecole, tn in the dept of Seine et Oise. France near Versailles famous for an abbey founded by Mme de Menthon who was abbess until her death in 1719. There is also a military school founded by Napoleon. Pop 8300.

St. Daboo's Heath see DABOUBIA PORTORIA.

St. David's, city 16 m S.W. of Fishguard and under 2 m from the sea, in Pembrokeshire, Wales. The fine sandstone cathedral which contains the stone screen of Bishop Gower (d. 1347) the carved stalls of Bishop Fully (d. 1481) and the fan vaulting of Bishop Vaughan (d. 1522) grew up because the pit in saint of Wales settled here in the sixth century. There are also splendid ruins of Bishop Gower's palace. The tn has become a summer holiday resort. Pop 1600.

St. David's Head, prominent rising 100 ft. above the sea, in Whitesand Bay N.W. Pembrokeshire, Wales.

St. Denis 1. Tn about 5 m N. of Paris, France in the dept of S. Seine. It contains a church which is a magnificent example of fourteenth century Gothic in which are the tombs of kings of France. Rail way carriages, locomotives, machinery,

chemicals, cardboard, and woollen stuffs are manufactured. There are also breweries and distilleries. Pop. 70,000. 2. Tn and the seat of the governor, at the mouth of the Saint-Denis, in the Fr. is. of Réunion. Pop 31,000.

St. Didier-la-Sauve, manufacturing tn., 19 m from Yssingeaux, in the dept of Haute Loire, France. Pop 6000.

St. Die (art Deodatum), tn, in the dept of Vosges, France 31 m N.E. of Epinal manufs iron goods, machinery, wagons, fire pumps, and dress materials. St. Die has a cathedral in the First World War it was held against violent attacks, Oct-Dec 1914, and suffered damage during the Second World War. Pop (1936) 17,000.

St. Dizier, tn 12 m from Wassy, in dept Haute Marne, France with iron, steel, and copper manufs. Pop 19,000.

St. Domingo, see SANTO DOMINGO.

St. Dunstan's Lodge, headquarters situated in Regent's Park London of a charitable organisation, founded in 1915 by Sir Arthur Pearson caring for men in the Army Navy and Air Force who were blinded during the First World War and for those blinded in subsequent wars. By the end of 1945, over 1000 men and women blinded in the Second World War had passed through St. Dunstan's. Pensions and allowances are given and many occupations taught such as carpentering basket making rug making, typewriting etc. The organisation depends upon voluntary subscriptions. See Sir C. A. Pearson *Let's Over Blindness* (1911) Sir L. B. B. *Blindness* (1942) and inn reports of St. Dunstan's.

Sante Aldegonde, Philipp van Marinx, Heer van (1535-98) Dutch writer and Protestant reformer. He studied theology at Geneva. He drew up the Compromise of Br. 15 (1566) opposing the Inquisition and other elements of Philip II. As mayor of Antwerp (1581-83) he defended the city against Alexander duke of Parma. Next to William of Orange he played the chief part in the liberation of the Netherlands. His prin work is a Calvinistic satire on Catholicism, *De Roomsche Bepoort* (1574) pub under the pseudonym 'Isaac Fablisticus'. He trans the Psalms into Dutch verse and was the principal author of the folksong *Wahthuis* an Association of the hymn of Dutch liberty. See J. I. Motley *History of the United Netherlands* 1. chap. in 1560. See also lives by P. van der Meer (1873) J. I. B. 1555-40. 1. Ommet 1834, Jan 1835, and 1. 1840-1896.

Sante-Beuve, Charles Augustin 1814-1890. 1. Literary crit. b. at Beaulieu sur Mer. In 1838 S. B. went to Paris where he attended the College Charlemagne and resided with a free thinking prof. a certain M. Leclercq, whose influence affected him considerably. From 1824 to 1827 he studied medicine at the same time he became a member in the world of letters, having joined the staff of the *Globe*. To this paper, during the next three years he contributed the poems and articles afterwards collected under the title of *Premiers Lundis*. In 1827 S. B.

severed his connection with this paper for political reasons and in the same year his enthusiastic and sympathetic review of Victor Hugo's *Odes et ballades* brought him the acquaintance of the poet. With the object of spreading the Romantic movement he pub. in the next year his *Tableau de la poésie française au dix-neuvième siècle*. In 1829 and 1830 he issued two works of original poetry, *Le ciel poésies de Joseph Delorme* and *Les Consolations*. But his sphere was not that of original poetic creation as the reception of his third and last vol. *Pensées d'adult* convinced him. From 1830 to 1836 he was under the influence of Lamennais and his mind was disturbed by religious and political questionings. He abandoned in turn, Catholicism, Saint Simonism and liberal Protestantism. In 1831 he pub. *Volupté* his only novel and in 1837 delivered at Lyons his famous lectures on Port Royal which rank him not merely as a superb literary critic but as one of the best historians of his time. His period of real greatness dates from his visit to Italy in 1840 for which the early part of his life had been a preparation. He was made keeper of the Mazuin library, and during the next nine years wrote almost entirely for the *Revue des deux mondes*. In 1841 he was elected to the Academy as successor to Casimir Delavigne and received in 1843. In 1848 he was made prof. of lit. literature at Liège and delivered his famous course of lectures on *Chateaubriand et son groupe littéraire sous l'Empire*. In 1854 he was made prof. of lit. poetry at the Collège de France. From 1849 onward his chief work was the literary *causeries* which appeared every Monday first in the *Constitutionnel* (1861-63) then in the *Moniteur* then again in the *Constitutionnel* until 1866 when he finally changed to the *Temps*. The *Causers du Lundi* and *Vendredi* form twenty-eight vols. (1861-61 and 1863-72) and the supplementary vol. to this collection. Charles Leroy's *Table générale et analytique* shows 515 enormous literary range. Other well known writings of S. B. are *Critiques et portraits littéraires* (5 vols. 1836-39), *Éroudh* (1867) and *Lettres* (4 vols., 1877-80). See lives by F. de la Harpe, 1872, D. Haussmann, 1873, also E. Faguet *La Jeunesse de Sainte-Beuve* 1914, G. Michant *Sainte-Beuve* 1921, J. F. Mott *Sainte-Beuve* 1922, and A. Bille-Sort *Sainte-Beuve et le XIX^e siècle* 1927.

Sainte-Chapelle, anct palace chapel in Paris. Louis XI had it built in 1443 to house the relics of the crown of thorns and piece of the true cross he had brought from the Holy Land. It is said to be the finest example of thirteenth century architecture in the world and its stained glass is also famous. See architects have suggested that the Perpendicular style originated here.

Sainte-Claire Deville, Étienne Henri (1818-81), Fr. chemist, graduated as doctor of medicine and science in Paris, and, after nine years of research in his own laboratory, became prof. of chem. and dean at Besançon (1843-51). In 1859

he accepted a chair at the Sorbonne. Besides developing a theory of 'dissociation to account for the phenomena of reversible reactions, he improved the preparation of pure aluminium, platinum and sodium, discovered anhydrous nitric acid (1819) and toluene and estab. a new method of mineral analysis.

Sainte Croix, Swiss vil. situated in the canton of Valais, at an elevation of about 3600 ft. Its inhab. are engaged in making watches and musical boxes. Pop. about 7000.

St. Edmund Hall, only anct hall that survives in Oxford Univ. It is named after St. Edmund Rich who taught in a house that once occupied the site and was founded c. 1226. From 1553 to 1937 St. 1 H. had close connections with Queens' College but in the latter year it became independent with a constitution modelled on that of the other colleges.

St. Elmo's Fire, brush like electric discharge which is sometimes seen on projecting objects, particularly on ships' masts and the aerials and wing tips of aircraft. It may appear as an enveloping fire or in the form of short streamers. It is not dangerous.

St. Eloi, vil. in Belgium in the prov. of W. Flanders, 2 m. from Ypres. During the First World War it was the scene of much local fighting and in March 1915 and April 1916 two battles were fought around it with largely indecisive results in which 1 th. sides suffered heavy casualties.

Ste Marie, 1 H. is 64 sq. m. in area under the gov. of Madagascar. It is 150 ft. from the coast, opposite Antsuanika. 2 Th. is near the coast and the mouth of the Ste. M. R. in the N.E. of Fr. Martinique.

Ste Marie-aux-Mines, tn. in the dept. of Haut Rhin, France, on the Rhen. 36 m. S.W. of Strasbourg. There is some mining carried on here but the chief trade of the place is now in textile fabrics. Pop. 12,000.

St. Emilion (so called from a native saint and hermit) vil. in the dept. of Gironde, France, 27 m. E. N.E. of Bordeaux. It is noted for the wine (similar in character to Burgundy) which bears its name. Pop. 3400.

Santes, tn. on the Charente, 47 m. S.E. of La Rochelle in the dept. of Charente Maritime, France. There are china and earthenware factories, iron foundries, market gardens, and brick kilns and considerable commerce in brandy and liquors. Ruins of the huge amphitheatre which seated 20,000, and the triumphal arch of Germanicus recall the prosperity of Mediolanum - the Roman name of S. under the empire and the cathedral of St. Peter commemorates the days when the city was a bishopric. The tomb of St. Eutropius the first bishop, lies in the spacious crypt of the church which bears his name. Pop. 23,400.

St. Étienne, cap. of the dept. of Loire, France, on the Lurens, 311 m. S.E. of Paris. Its oldest industry is the manuf. of fire arms, and the factory was bombed by the R.A.F. during the Second World War. St. Étienne was once the first city in

the world in the ribbon trade and is noted also for its variety of trimmings. Hemp cables, chocolate and glass are also manufactured and there are important dye and chemical works. The neighbourhood of large coal fields accounts for the many busy factories where automobiles, agricultural implements, machinery, etc. are made. The line between St. Pierre and Andrézieux (constructed in 1828) was the first railway of France. Pop. 175,000.

St. Eustatius, or St. Eustache, is of the Dutch W. Indies with an area of 7 sq. m. situated in 17° 0' N. lat. and 62° 40' W. long. 12 m. N.W. of St. Kitts. The surface is uneven, sev. of the hills being volcanic in character. The chief tn. is Oranjestad. It exports potatoes, sugar and tobacco. It was first occupied by the Dutch W. India Company in 1634. In 1781 it was captured by Rodney but was afterwards restored to the Dutch. It is coming under the sway of Curacao. Pop. 1100.

Saint-Evremond, Charles de Marguetel de Saint-Denis, Seigneur de see FARMONT SAINT.

Saint-Exupéry, Antoine de (1900-44). Fr. writer and novelist. His fugitive pieces and novels mostly relate to his flights and are: *Night Flight* (1931), *Wind, Sand and Stars* (1939), *Flight Seller in the U.S.A.*, *Flight to Paris* (1942) and *The Little Prince* (1943), a children's book with his own illustrations. He received the Prix Littéraire de la France in 1931 and in 1933 the Grand Prix of the Fr. Academy. He was killed in an aeroplane accident.

St. Gall, tn. and cap. of the canton of its own name, Switzerland, is seated in a narrow valley on two small streams, 35 m. E. of Zurich. It has an ancient abbey and a cathedral, the former of which has a library containing many valuable MSS. The chief industries are the manu. of fine muslin, woollen, linen, cotton and embroidery. Pop. 6,500. The canton borders N.W. in the lake of Constance, between the cantons of Appenzel and Thurgau. The industries mentioned above also apply to this canton. It joined the Swiss confederation in 1803. Watered by tribs. of the Rhine, St. G. has an area of 779 sq. m. and a pop. of 286,000 of whom about three fifths are Protestants.

Saint-Gaudens, Augustus (1848-1907). Amer. sculptor b. in Dublin. His mother was Irish and his father a Fr. shoemaker. He settled in New York after studying at the Ecole des Beaux-Arts in Paris and in Rome (1870-73). He carved statues of Adm. Farragut (1884), Lincoln (1887) and Gen. Sherman (1903) and also of 'Hawthorne' and 'Clerk'. His chief merit was the realism of his portraiture. His symbolical compositions are conceived in the classicist style, fashionable in America and Europe during his lifetime but their creative and sculptural achievement has been largely overestimated.

Saint-Gelais, Melin de (1481-1558). Fr. poet b. at Angoulême, who is credited, together with Marot, with the introduction of the 16-sonnet into Fr. literature, then so

much in vogue in the second half of the sixteenth century. He was an imitator of the 16s and in his search for elegance, fell into sentimentalism and mannered preciousness. He was the literary purveyor of court amusements in his *rondeaux*, *quatrains* and *mascarades*, and, like Marot, he was pioneer of the *blason* which celebrates an eyebrow, a flower or a jewel. His fame was of short duration, being eclipsed by Ronsard and the Pléiade.

St. George, name of two vils in Quebec (one in Brance, the other in Richmond) and a third in New Brunswick, Canada.

St. George del Mina, see LIMA.

St. George's, 1. In on St. George's Is. second most important is of the Bermudas lying N.E. of the main is. The is. has a spacious harbour on which stands the tn. which was founded in 1612 and was the cap. of the Bermudas until 1815. Pop. 1,000. 2. Cap. of Grenada, Brit. W. Indies. It was estab. by the Fr. in 1705 when it was called Fort Royal. It received its present name during the administration of Robert Melville (1764-71).

St. George's Church, erected soon after 1763, contains interesting tablets to the memory of the victims of the Bermudas war 1795. The inner harbour, the Carenage, was so called from its lying flat in old times, a favourite place for careening ships and it is remarkably picturesque. Pop. 6,000.

St. George's Cay small is. lying 10 m. N.E. of Belize, Brit. Honduras, which is of historical interest for the memorable engagement of 1798 in which the Spaniards were defeated by the British or lumbermen settlers.

St. George's Channel separates Wales from Ireland. Its breadth varies from 50 to 30 m.

Saint-Germain Comte de d. c. 1791-94). Fr. adventurer. His origin is obscure and the date of his birth is unknown. He was commonly supposed to be of Fr. parentage though some supposed him to be the natural son of Charles II. of Spain. In 1748 he came to France from Germany, claiming alchemist's powers and saying that he was 2000 years old. St. G. appears to have been of considerable intelligence, able to live on his wits by exploiting the credulity of the rich men of the time. He was at one time the confidential agent of the Fr. king and lived in St. Petersburg and London for some years. He took part in magical practices with the landgrave, Karl of Hesse, and may have died in Schleswig-Holstein in 1784. But travellers reported meeting him in revolutionary France as late as 1793. See A. Lang, *His torical Miracles*, 1904; J. Cooper Oakley, *The Comte de St. Germain*, 1928.

St. Germain-en-Laye tn. in the dept. of Seine et Oise, France, situated 300 ft. above the Seine 12 m. W.N.W. of Paris. The splendid terrace is a favourite promenade for visitors from Paris. Four Fr. kings, including Louis XIV., were born in the castle, which presents much the same appearance as it did in the days of Francis I. Here dwelt James II. of England from his banishment till his death (1689-1701). Pop. 21,700.

St. Germain-en-Laye, Treaty of: concluded the state of war between Austria and the allied powers, signed at St. Germain, on Sept. 10, 1919. Ratifications were delayed but were exchanged on July 16, 1920. The draft treaty of June 2, 1919, was the subject of much controversy between the Austrian delegates and the Supreme Council of the allied powers. The Austrians held that the republic of Austria was a state *de novo* and one of the Hapsburg Succession States to be treated in like manner with Czechoslovakia and Yugoslavia. The Allies, however, maintained the new Austrian Republic to be the direct heir to the responsibilities of the old Austria. On ethnic grounds the Austrians also protested against the inclusion of 5,000,000 Austrians in Czechoslovakia, 200,000 in Italy, and seventy thousand in Yugoslavia. The Allies admitted the ethnographical argument but could not allow it alone to influence them. Some concessions were made to Austria, especially in the economic clauses which the Austrian delegates desired. Austria could not fulfil the treaty of Radkersburg was returned to Austria but the only plebiscites allowed were those in the Klagenfurt basin and in Fieschen. The treaty established the frontiers of Austria, the major decisions being the inclusion of Ger. Tyrol S. of the Brenner in Italy and of Ger. Bohemia in Czechoslovakia while the Supreme Council vetoed the inclusion of Ger. Austria in Germany. Allowances were made for the protection of minorities but Austria renounced all claims in Egypt, Morocco, China, and Siam. Military, naval, and air forces were limited and reparations were imposed. The ceremony of signing the treaty took place in the Stone Age Hall in the Chateau St. Germain. Dr. Renner, chancellor of the Austrian Republic, was the principal signatory for Austria.

St. Germans, vil. 9 m. W. N. W. of Plymouth, in Cornwall, England. The seat of the bishop of the diocese till about 1050, St. G. is noted for its fine Norman church and for seventeenth century brick houses. It is the country seat of the Elliot family, earls of St. G. Pop. (par.) 3000.

St. Gilles: 1 Tn and small port 12 m. S. E. of Nîmes in the Dept. of Gard, France. Its beautiful Romanesque abbey church dates from 1116. Pop. 800. 2. Flemish Sint Gillis, a rural and manufacturing suburb of Brussels, Belgium S. of the city. There are manufs. of perfumes, soap, chemicals, shoes, pianos, lace, and canned goods. The ancient Hill, the only remnant of the fortifications of Brussels in the fourteenth century, is now a museum. Pop. 61,300.

St. Giuliano, Monte (see Fr.).

St. Gotthard, or St. Gotthard, name of a famous pass over which runs a carriage route (constructed in 1820-24) connecting the lakes Lucerne and Maggiore. There has been a hospice on the summit (6936 ft.) since 1331. The great St. G. tunnel, which extends from Göschenen to Airolo, 9½ m., was built in 1872-80.

St. Gowan's Head, or St. Govan's, promontory of S. Pembrokeshire, Wales.

St. Helena, Brit. Is. and crown colony in the South Atlantic Ocean, 700 m. S. E. of Ascension (qv) and 1200 m. from Mossamedes, the nearest African port in 15° 57' S. lat. and 5° 42' W. long. It is volcanic in origin and 104 m. long and 64 m. broad, its area being 47 sq. m. Although situated in the heart of the S. E. trade winds and surrounded by the cold S. Atlantic current, there are considerable variations of temp. and rainfall between the coastal and hill zones. The climate is mild and equable. The is. is well watered by abundant clear springs. It supplies provisions to ships, and exports flax fibre, tow rope, lice and lily bulbs. The gov. of St. H. is administered by a governor aided by executive and advisory councils. The governor alone makes ordinances, there being no legislative council but power is reserved to legislate by Order in Council. There are ten primary schools and one secondary. St. H. is an admiralty coaling station, and before the Second World War it was visited by two of the Cape of Good Hope squadron every year. There is no internal post but there are about 7 m. of telephone lines. There is a cable station from which cables connect with Cape Town and Ascension thus linking the colony with all parts of the world. Jamestown (pop. 1,000) is the cap. and only town. It is a free port. Pop. in 1946: 1743.

History: St. H. was discovered by the Portuguese commander João da Nova (Castell) in 1502 on his return voyage to India from India. It was then uninhabited and seen to be well wooded. Until 1588 the situation of the is. was kept a secret when it was visited by Capt. Thomas Cavendish in the *Desce* on his return from a voyage round the world. After this visit the is. became a port of call for ships of various nations voyaging between the E. Indies and Europe. In 1633 Jacques Specz formally annexed it on behalf of the Dutch States General but the Dutch made no attempt to occupy it. In 1660 it was annexed and occupied by Capt. John Dutton on behalf of the E. India Company. It remained in possession of the company (except for an interval between 1810 and 1821 when the Brit. Gov. took it over) until 1834 when it was brought under the direct government of the Crown. With the increase in shipping from the is. the colony enjoyed thirty years of great prosperity but the opening of the Suez Canal in 1869 caused trade to be diverted to the Mediterranean. St. H. was a port of call for a vast quantity of shipping to and from India and other parts of the E., and large estates were maintained both civil and military. The is. was once also a depot for liberated Africans funded from slaves captured by the W. Coast Squadron. During the S. African war (1899-1902) the is. served as quarters for two to three thousand Boer prisoners, but its chief notoriety arises from the years of exile and confinement which Napoleon passed at Longwood (3 m. inland from Jamestown) from 1815 till his

death in 1821. Among the Boer prisoners was Gen. Piet Cronje (q.v.). In 1922 the is. of Ascension, till then under the control of the Lords Commissioners of the Admiralty, was transferred to the administration of the Colonial Office, and annexed to the colony of St. H.

See Osorio da Fonseca, *Narrative of the Voyage of Joana Nova in 1502*, trans. by J. Gibbs 1752, J. Barnes, *A Tour through the Island of St. Helena*, 1817, and P. Gosse, *St. Helena 1501-1558*, 1938 (a detailed hist. with full bibliography). For works on Napoleon's exile see W. N. Young, *Napoleon in Exile St. Helena* 1915, and Dormer Creston *In Search of Two Characters* 1945-1947.

St. Helens 1 Co bor and mkt tn of Lancashire, England, 13 m. E.N.E. of Liverpool. There is communication by canal with the Mersey. The original nucleus from which the tn has grown was the met. vil. of Hardshaw which grew up during the fourteenth century around "met. Hlyn's chappell". The modern tn church occupies the site of the old "chappell" in Hardshaw. Coal was discovered in the vicinity in the early sixteenth century. This marked the beginning of St. H.'s growth into one of the large tns of the Lancashire coal field. Progress came rapidly with the construction in 1762 of the Surrey Navigation, the canal system which connected St. H. with Warrington. Jean de la Haye introduced glass making. In 1773 a commercial company was established the Brit. Plate Glass Company. Copper in chemical works followed. The famous glassworks of the Lillington family were estab. at St. H. in 1827 and other firms were estab. in 1840 and 1850. Metal foundries, tanneries and breweries were started. St. H. was incorporated as a bor. in 1868 and became a co. bor. in 1889. Since 1888 it has been a parly. Notable public buildings are the tn hall founded in 1876 and completed in 1879, the market hall, the co. court and the Gamble Institute. There are good educational facilities. Victoria Park contains the Mansion House. Museum. Pop. 108,000. 2 Tn. $5\frac{1}{2}$ m. S.E. of Hyde in the Isk of Wight, England. Pop. (estimated) 1100.

St. Helier, seaside resort cap. of the is. and also a fishing centre in St. Aubin's Bay with Channel Islands ferry. St. H. is a popular waterin. place and contains many co. schools. Pop. 6,000.

Saint-Hilaire, see BARTHILEMY SAINT-HILAIRE, Jules Godefroy SAINT-HILAIRE, YVES.

St. Hilda's, women's coll. at Oxford Univ. It was founded by Dorothy Beale in 1593 as St. H. Hall and changed its title to coll. in 1926. There are scholarships and exhibitions some of which are reserved to candidates from Cheltenham Ladies' coll.

St. Hubert, tn. 30 m. N.E. of Sedan in Luxembourg, Belgium. Many pilgrims yearly visit the shrine of St. H. in the fine abbey church. It was the scene of heavy fighting in the course of J. M. von Rundstedt's great counter-offensive in the

Ardennes (Dec. 1944-Jan. 1945). Pop. 2400.

St. Hugh's, women's college at Oxford Univ. founded as St. H. Hall in 1886, and incorporated as a college in 1926. Scholarships and exhibitions are awarded.

St. Hyacinthe, tn. with woollen and cotton shoe, door, and clothing manufs., and two cathedrals. It is 32 m. N.E. of Montreal in Quebec, Canada. Pop. 17,900.

Saintine, Joseph Xavier Boniface (1798-1863) fr. writer of novels and plays, he won a prize for his *Pucelle* (1836), and with *Scout* (1837) attained the high reputation he had won in his plays *L'ours et le pacha* (1827) *Riches d'amour* (1845) etc. He collaborated with Scobie Bayard and others.

St. Ingbert, centre for coal mining and glass manufs. 14 m. W. of Zweibrücken, in Saarland. It possesses iron and steel works. Pop. 20,500.

St. Ives 1 (So called from the Irish virgin and martyr), picture postcard seaside resort with magnificent beaches on St. I. Bay on the N. coast of Cornwall, England. 13 m. from Lands End. An artists' colony was founded by Sickert and Whistler. Pop. 8800. 2 Bor and mkt tn. 1 Hundred, Lancashire, England, on the E. bank of the river Mersey. It was the site of a priory founded in the twelfth century as a cell to Ramsey abbey, but owes its importance to the great fair which it longed to the abbots. There is a fine church and a sixteenth-century bridge in the centre of which is restored two-storeyed chapel. Pop. 3200.

'**St. James's Gazette**,' see LYNIN, 'STANDARD'.

St. James's Palace in Dublin, undorned brick structure of very unpretentious exterior now only used for levees and for apartments of court officials. Before the Normans conquest the site was occupied by a hospital, later in the charge of Canon Cole, who presented it to Henry VIII in 1531. This monarch laid down the hospital built a palace in a walled park which was much enlarged by Charles II and still remains. St. J. Park, the palace which contains some fine pictures was a royal residence until 1702 when Whitehall was burnt down (ill. 15). When Queen Victoria moved to Buckingham Palace the palace and the park and royal were closed during an interval in 1914.

St. James's Theatre in King Street London W.1 was founded in 1850 with the play *Agnes Sorel* under the management of John Lubbock. It is the oldest theatre in the West End of London and has 1,800 seats. In 1891 it came under the management of Sir George Alexander and was the scene of many of his triumphs. *Tat. White mares* Ian was produced there in 1912 and *The Second Mrs. Tanqueray* in 1916 following it. In 1910 Sir Laurence Olivier, as actor-manager, opened there with *Henry O'Brien*.

Saint Jean d'Acre, see ACHI.

St. Jean-de-Luz, fishing tn and seaside resort of France stands on the bay of

Biscay, at the mouth of the Nivelle in the dept. of Basses Pyrénées. It lies 12 m S.W. of Bayonne. A fortified town, with a fine old church and an interesting château and other old buildings, it is noted for its sea bathing and has a casino and a hydrotherapeutic estab. Pop 10,200.

Saint John, cap. of St. J. co. New Brunswick, Canada, at the mouth of the St. John R. 66 m S.S.E. of Fredericton. It was discovered by Champlain on St. J. the Baptist's Day (June 24, 1604). Charles de La Tour erected a fort in the harbour in 1633, but lost his fort to the Eng. victors of Acadia in 1664. But no permanent settlement was made until 1783, when the Tories founded the present city, its original name being Parrtown, after Governor Parr of Nova Scotia. It is an important fishing, railway and distributing centre for a district busily engaged in agriculture and the lumber trade. Cotton goods, boots and shoes, engines, etc. are manufactured and there are saw and grist mills. Fishing is carried on on a commercial scale. It is a summer resort and coal mines and granite and lime-tone quarries are worked. St. J. is one of the winter ports of Canada for the passenger and other vessels from Europe. In exports it is second only to Montreal. Pop. 21,700.

St. John, largest (100 m long) riv. of New Brunswick, Canada, draining into the Bay of Fundy at Saint John. On its banks rises in Quebec the other, called the Wolf, whose course begins in the highlands N. of Montreal for 80 m. forms with a S. easterly course the international boundary between the U.S.A. and Canada. The tributaries are the Abegash, Apogash and Oromocto on the E. and the St. Francis, Madawaska, Tobique and Salmon on the W. The valley of the riv. is known for its fertility and for its picturesque features. The cataracts of the Grand Falls in Canada (22 m. from the sea) drop down over 75 ft. At Saint John, above the mouth are the reversible falls, here the riv. is forced through a narrow opening and thereby gives the illusion of a fall which runs in either direction according to the movement of the tide. Fredericton (83 m up) is the limit of navigation for larger vessels.

St. John, large lake of Quebec, Canada, communicating with the St. Lawrence by way of Saguenay R.

St. John, town which was partially demolished by an earthquake in 1843 on the N.W. of Antigua, W. Indies, and the seat of the colonial governor. It has a good harbour for small ships and considerable commerce in fruit, especially pineapples, and sugar and cotton. Pop. 10,000.

St. John, Hector, *see* CLYDEBUR.

St. John, Henry, *see* BOILINGBROOK.

St. John, Henry, *see* ST. JOHN.

St. John, Knights of, *see* HOSPITALIERS.

St. John, Knights.

St. John, Knights of, *see* HOSPITALIERS.

St. John, Knights of, *see* HOSPITALIERS.

St. John, Knights of, *see* HOSPITALIERS.

St. John, Knights of, *see* HOSPITALIERS.

St. John's, cap. of Newfoundland, Canada. It lies 2050 m. from Liverpool and 1730 m. from Cork (Ireland) on the E. shore of the island, in the peninsula of Avalon. The centre of the whole island and cod-fishing; it has excellent harbour, wharf, and dry dock accommodation. The other industries are mainly allied to the fishing, as, for instance, oil-technique, but there are also foundries, breweries, tanneries, cordage, furniture, biscuit and boot and shoe factories. In 1810, 1811 and 1812 the town suffered severely from fire and the old wooden houses have since been replaced by stone buildings. The Roman Catholic cathedral is the largest building in Newfoundland. There is also an Anglican cathedral. Cabot Tower on the summit of Signal Hill commemorates the fourth centenary of the discovery of Newfoundland by John Cabot (1497). The construction of the present government house was completed in 1825. The House of Assembly building is particularly fine. Pop. 62,800.

St. John's, cap. of St. J. co. Quebec, Canada. It lies on the Richelieu 27 m. by rail S.E. of Montreal. Grain and lumber are exported. In 1776 it was the key to Canada; the Eng. forces gathered there under Major Preston long resisted Montgomery's advance. As a training school for Canadian cavalry the town still has some military life. Produces dairy products, sewing machinery and sugar machinery. Pop. (1931) 11,300.

Saint Johnsbury, manufacturing town and the co. seat of Caledonia co. Vermont, U.S.A. 30 m. N.E. of Montreal. The minerals include scales, machinery and farm implements, maple sugar and dairy. Pop. 13,000.

St. John's, Eve of, or **Midsummer Eve** (June 23) celebrated with song and dance throughout Christendom in the Middle Ages. In some countries fires were kindled in the market place, and the young folk joined hands and danced around. It was an Eng. custom to fetch branches from a neighbouring wood and fasten them over doors in sign of announcing the Baptist's birth. Sometimes the blessing of the par. priest was asked as a sanction for the merry-making.

St. John's College, Cambridge, founded in 1511 by the Lady Margaret Beaufort. Her executors supervised its building.

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among them Bishop Fisher of Rochester. There are four courts, the most easterly with its fine gateway dates from the Tudor period, the second contains a pancelled master gallery with fine mouldings (1598-1602). The so-called Bridge of Sighs connects the third court with the fourth, which is on the other side of the Cam. The endowment includes nine seats, sixty scholars and sixty fellows besides a master. Lord Broughley, Roger Ascham, Wordsworth, Castelnau, Palmerston and Sir J. Herschel were students here.

St John's College, Oxford, founded in 1555 by Sir Thomas White, alderman of London. There are two quadrangles. In the first is incorporated part of St. Bernard's College (founded in 1437) which formerly occupied the site and to which the fine gateway giving on to St. Giles Street also belongs. The second was built by Archbishop Laud who has buried in the chapel together with the founder and whom in his lifetime was very intimately associated with the college. This quadrangle which is interesting by reason of the fusion of Classic and Perpendicular styles overlooks the fine college gardens. Fifteen of the twenty-eight scholarships offered are reserved for the Merchant Taylors' School and Canon and James Shirley were at St. J.

St John's River, chief riv. of Florida, U.S.A. Rising in Bayard co. it flows N. and finally at Jacksonville (15 m. from the mouth) takes an easterly turn before reaching the Atlantic. Enterprise (200 m. up) is the limit of navigation. The St. John's is 100 m. long and passes the well-known George Dexters and Monroe.

St Johnstoun former name of Perth in Scotland.

St John's Wood, suburb of London in the E. of St. Marylebone 4 m. N.W. of St. Pauls.

St John's Wort name for a number of plants with cymes of yellow flowers forming the genus *Hypericum*, they are so called from coming into flower about the feast of St. John Baptist (O.S.). Common St. John's wort (*H. perforatum*) has its leaves dotted with pellucid glands. The larger flowered St. John's wort is called Sharon (*H. alcyonum*) is a trailing plant often grown in shrubberies. Most of the species are aromatic and resinous.

St Joseph 1. Co. seat of Buchanan co., Missouri, U.S.A. established as a trading port in 1826. It is on the Missouri 68 m. by rail N.W. of Kansas. It has 12 stock yards and is engaged in the industries of slaughtering, meat-packing, and the manufacturing of clothes. It has an important grain market and considerable manufs. of iron goods, including boilers and ploughs. Pop. 7,700.

Centre of a peach growing dist. and the co. seat of Berrien co., Michigan, U.S.A. It is at the mouth of the St. Joseph and has commercial fisheries. It has diversified manufs. and is a summer resort. Pop. 9,000.

St. Josse-ten-Noode (Dutch: Sint Joost-ten-Noode), 1. suburb of Brussels in Brabant Belgium. It has manufs. of

lace, soap and cork and also iron foundries and breweries. Pop. 28,100.

Saint-Just, Louis Antoine Léon Florelle de Richebourg de (1767-94), fr. revolutionary leader, b. at Decize near Nevers. At the beginning of the revolution he was elected to the National Guard of the Aisne and member of the electoral assembly. Having formed a friendship with Robespierre, he became deputy of the dept. of Aisne to the National Convention (1792). The following year he was appointed a member of the Committee of Public Safety and drew up the reports upon the overthrow of the Girondists and the Hébertists. He also wrote the denunciation which caused Danton's overthrow. Having proposed that the Convention should control all military operations, he was sent to the armies of the Rhine and Moselle. He carried out his mission with such relentless vigour that on his return he was elected to the presidency of the Convention (Feb. 1794). He was instrumental in securing Belgium for France (May 1794) while in command of the army in the N., but was recalled to Paris by Robespierre and was eventually arrested at the sitting of the 9th Thermidor and was guillotined. See *Annales de Saint-Just*, *premier d'annee de la République sur sa vie* 1833 34, J. H. Michel, *Histoire de Saint-Just* 1859, C. Velly, *Annales simplifiés de Saint-Just* 1908.

St Just 1. **St Just in Penwith**, urb. dist. about 15 m. W. of Truro and 1 m. N. of Looe in Cornwall. It is chiefly agricultural but most of the mines are now disused. It has an amphitheatre. St. Just Round where miracle plays used to be performed. Pop. approximately 4,000.

St Just-in-Roseland, vil. of Cornwall, England 4 m. N.E. of Falmouth. The church was founded in A.D. 50, taking its name from St. Just who preached the Gospel in England before the coming of Augustine. The vil. and church are noted for the unspoiled beauty of their surroundings. Pop. 300.

St Kilda 1. Most remote of the Outer Hebrides in the Atlantic 140 m. W. of the mainland of Scotland. It is about 1 m. long by 2 m. broad with precipitous, rocky bound shores all round the island, with the exception of the only landing place in the S.E. It is the home of immemorial wildfowl. The few inhabitants were obliged to leave St. K. for the mainland in 1928. 2. City of Bourke, Victoria, Australia, a fashionable watering place on Hobson's Bay 5 km. from Melbourne. It possesses a fine esplanade and the pier is the longest in Australia. There are special facilities for bathing, a public park and many fine buildings. Pop. (1911) 56,156.

St Kitts, or St Christopher one of the Brit. W. Indian is. with an area of 61 sq. m. Discovered by Columbus in 1493, it was occupied by both the Incas and the Spaniards in 1623, but was ceded to Great Britain in 1713. This is. belongs to the Leeward group of Lesser Antilles. It is 23 m. long. The central part is a range of rugged mts. culminating in Mt. Misery.

(3700 ft) The main range overlooks a fertile plain at the S.W. of which is Basseterre cap and port of the is. Sugar is the chief industry, sea is cotton tobacco, molasses, coffee and limes are also grown. There are salt ponds at the S.E. corner of the is. It is an administrative unit of the Leeward Is. St. K. was discovered by Columbus in 1493 and settled by Eng and Fr about 1625. In 1713 the Fr ceded the is to Britain and Brit rule became finally secure after 1752.

St. Kitts, Action of At the peace of Utrecht (1713) the is. of St. Kitts was entirely ceded to the Brit. Crown but in 1782 it was attacked by the Fr. Admiral the comte de Grasse. Adm. Sir Samuel Hood who was then in command of the W. Indies failed in his attempt to prevent the capture but by a series of bold movements he succeeded in turning the Fr. out of the cap. (Basseterre) and beat off their attacks.

Saint-Lambert, Jean François Marquis de (1716-1803) Fr. poet and philosopher b. at Nancy. He entered the service of Stanislas, king of Poland and served in the Fr. army in Germany in 1756-57 but owing to ill health he had to retire. He then pub. his poem *Les Saisons* (an imitation of Thomson's *Seasons*), and as a consequence was admitted a member of the Fr. Academy (1770). Some of his other works are *Ode sur l'Infortuné*, *Le Malin et le sot*, *Les Deux Amis* and *Les Principes des mœurs chez toutes les nations*. But he is chiefly remembered as one of the *Fin de siècle* poets and as the lover of the marquise de Boufflers the marquise de Châtelet and Mme. d'Houdrot (Kousseaux Sophie).

St. Laurent Louis Stephen (b. 1882) Canadian statesman b. at Compton, Quebec son of a general forekeeper his father being 11 and his mother Irish. He studied law at Laval Univ. By the time he was thirty he had established himself as one of the most successful lawyers in Quebec. In 1941 he was drafted into the Canadian Gov. for temporary wartime service though he had had no previous legal experience. As leader of the Fr. Canadians and despite his previous isolationism St. L. supported conscription for overseas service (1944). As minister of justice he saw a characteristic firmness in dealing with the affair of the Russian Communist spy ring (see *Canada History*). In 1946 he returned to Quebec and prepared to resign during his wartime work at an end but King now invited him to assume the Ministry of Foreign Affairs. By the middle of 1948 St. L. delivered speeches in the United Nations similar to King's habitual caution had deeply impressed the Canadian people and when King announced his retirement and the Liberal party called its Aug. convention the first since 1919 St. L. was chosen as leader at once. On Nov. 1, 1948, he was sworn in as Prime Minister. In the spring of 1949 in the Canadian Parliament without warning he proposed that Canada join the Brussels pact (see *BRUSSELS TREATY*) form a N. Atlantic alliance, and fight for W. Europe against

any aggressor. Thus St. L. was the first responsible N. Amer. statesman to propose the N. Atlantic defence system. His chief task subsequently was the coordination of the Canadian and American economic systems.

St. Laurent-du-Maroni, tn and port of Fr. Guiana on the Maroni R. The colony's penal settlement is here. It is the second tn of the colony has a wireless station and a pop. of 2000.

St. Lawrence 1. Large riv. of N. America issues from the Lake of Ontario and is fed by the Great Lakes whose surplus waters are taken to the Atlantic after a N.E. course of 700 m. The St. Louis R., which flows into Lake Superior near Duluth is reckoned its head waters, and the length from the source of this riv. to the gulf of St. Lawrence is 1300 m. Between lakes Superior and Huron the riv. is known as the St. Mary between lakes Huron and St. Clair as the St. Clair it becomes the Detroit between St. Clair and Erie and the Niagara between Erie and Ontario. The St. Lawrence proper has an average width of 14 m. and the width of its estuary near Cape Gaspe is over 100 m. This great waterway is navigable to Fort William at the head of Lake Superior a series of canals having been constructed to avoid natural rapids. The Welland Ship Canal opened in 1900 is one of the finest engineering feats of the world especially so in the outlet of the lake where are the Thousand Islands. Between two of the expositions St. Francis and St. Louis a great canal ship and has been constructed. Water power is much exploited. At Quebec the riv. is crossed by a bridge which has the widest span in the world. The fisheries of the St. L. are profitable and its basin contains excellent agricultural country devoted chiefly to mixed tillary farming and to fruit growing. The total drainage area including the Great Lakes system is computed at over 500,000 sq. m. and the basin contains one half of the world's fresh water. From Quebec to its mouth the riv. is at least 100 ft deep. From the St. L. to the gulf of St. Lawrence the fall is over 600 ft. The gulf of St. Lawrence into which the riv. empties is almost enclosed between Quebec Prov., New England, Cape Breton Is., Nova Scotia and New Brunswick. The project of building a dam to provide hydroelectric power on a large scale to be shared by the U.S.A. and Canada was raised 5 times between 1914 and 1918 but failed to gain the approval of the American senate. In 1948 the power authority of New York State and the hydroelectric power commission of Ontario filed identical plans for the development of the project which would result in 2,200,000 h.p. hydroelectric development. The governor of New York was responsible for instructing the state power authority to undertake the task after the Amer. Senate had refused to ratify the St. Lawrence Seaway Treaty. See G. W. Brown, *St. Lawrence River*, 1905, S. E. Dawson, *The St. Lawrence in Basin and Borderlands*, 1905, I. Ireland, *St. Lawrence Deep*

Waterway to the Sea 1931, and C. P. Wright *St. Lawrence Deep Waterway*, 1936. 2 In of Alaska 100 m long 10 to 30 m wide lying across the Bering Strait between Siberia and the Seward Peninsula.

St Leger, Sir Anthony (c 1496-1559) lord deputy of Ireland. He was educated in France, Italy and at Cambridge and was active under Thomas Cromwell demolishing abbeyes. He was head of a commission inquiring into the state of Ireland, 1537-38. St L was knighted, and escorted Anne of Cleves to England, 1539. He was appointed lord deputy July 1540. K.G. June 1541. He died during investigation of charges of falsification of his accounts. He established tenures in Ireland and introduced the case.

St Leger, see under Horse Racing

St Leonards, tn and seaside resort of Sussex, England; it forms a residential W suburb of the bor of Hastings.

St Lô (anc. *Briovera*), cap of the dept of Manche, France, on the R. Vire, 21 m W.W. of Bayeux. Formerly the astronomical observatory. Noted for manufacture of flannel paper and druggery. Its possession was bitterly contested between Amer and Ger forces in the fighting of June-July 1944, but when finally captured by the Amer, it was almost entirely destroyed. Pop 10,000.

St Louis, 1. Largest city of Missouri, U.S.A., and seat of St. Louis stands on the W bank of the Mississippi, 20 m below its confluence with the Missouri. It is the seat of St. J. and Washington univers. and contains many fine buildings including cathedral and Protestant cathedrals, the public library, city hall, court house and a number of commerce. The municipal office in theatre has a seating capacity for 1000 persons. There are some 2700 ac of parks. St. J. is of great importance commercially and industrially. Over 50,000,000 lb of tobacco are produced annually; there are cotton mills, slaughtering yards and meat-packing establishments and it is the world's greatest raw fur market. Other industries include zinc and lead smelting, founding, engineering, printing and publishing and the manufacture of textiles, boots and shoes and motor cars. Its modern prosperity is partly the result of the efforts of 30,000 Ger immigrants who settled there in 1850. It is served by six trunk railway lines and there is considerable river traffic. Other fine bridges afford communication with 1. St. Louis on the opposite side, one being kind to accommodate more freight cars than any other bridge in the world. St. L. was named after Louis IX of France and was founded in 1764 as a fur trading post by a Frenchman, later expelled. It passed into the possession of the U.S.A. as part of the Louisiana Purchase in 1803. The forty mile circuit of which it is the business and banking centre has a pop of over 1,500,000. Pop of city 816,000. 2. Cap. of Senegal, W. Africa, 165 m from Dakar on the is. of Senegal. It is one of the four com. represented in the 1. parliament. Pop 19,200.

St. Lucia, Brit. W. Indian is. largest

of the Windward Is., 24 m due S. of Martinique and 30 m N.E. of St. Vincent with an area of 233 sq m. Being volcanic it is very mountainous but has fertile valleys. The most conspicuous peaks are the Pitons, two remarkable sugarloaf mts. on the W. side, which have been for generations a landmark for sailors. Gros Piton is 2619 ft and Petit Piton 2481 ft. Near the latter is the Soufrière, a low-lying volcanic crater which is generally in a state of mild activity. There are numerous rivers. The cap. is Castries which was largely destroyed by fire on June 19, 1945, 20,000 of the pop. of 21,000 being rendered homeless. The climate, though humid, is favourable for Europeans. The average temp. ranges from 72° to 90° F. Rainfall averages 90 in per annum. Sugar, bananas, coconuts, limes, coffee, and nutmegs are grown. There are several sugar factories and a factory for extracting oil from coconuts and castor oil seeds. The is. is governed by an administrator responsible to the governor of the Windward Is. and an executive council. There is a legislative council comprising the governor and a number of *ex officio*, nominated and elected members. On the right of the harbour of Castries is a spacious dock with a lightery and light and on the left is the Vigie, a promontory on which a military hospital and barracks were built over forty years ago. The older houses of Castries and the street names and the patois spoken by many of the inhabitants recall the former 11. occupation of the is. (see *History* below). Near the centre of the tn is Columbus Square with the Roman Catholic Church at the E. end and the Carnegie library well known.

History—St. L. formerly called St. Alouise, derives its name from the fact that it was discovered by Columbus on St. Lucy's Day in 1502. In 1633 an Englishman, Capt. Judge, brought there some 11. settlers from St. Kitts, but they were driven out the next year. For many years France and England disputed the ownership of the is. About the year 1700 the 1. came in from Martinique. In 1764 Lord Francis Willoughby, ignoring 11. pretensions, sent 1000 Barbadians to St. L. who overpowered the 11. settlers, but themselves gave in to native wars in 1782, two years later. The 1. came again to the is. in 1767 and apart from Robert Falk, who was governor in 1664, there was a succession of thirty-six 1. governors from 1631 until 1793. In 1713 the 1. king granted the is. to the marquis de La Roche, but when the marquis died, the 1. king rejected and later George I. granted it to John, second duke of Montagu. Neither side really wanted the is. as a truly promising venture. St. L. is valuable in its use as a fueling station and later through Rodney's advice, as a strategic base. But by way of compromise, England and France agreed to cede the is. and only to cede it for certain restricted purposes until the title could be finally settled. By the treaty of Aix-la-Chapelle, 1748, the is. was declared neutral. In the Seven Years

war the is. surrendered to Rodney but the surrender was nullified at the end of the war when the is was definitely assigned to France. The Fr decided to establish a gov there on an impressive scale, and it was during the administration of the Chevalier de Micoud that the prin fort on the Vigne peninsula was moved to the Morne Fortuue and the tn begun at Little Carenage Bay to the right of the harbour, was transferred to its present locality. Castries, the cap was so named by the baron de Laborie governor in 1784, after the Fr colonial minister, the maréchal de Castries. Rodney it took the is from the comte d'Estaing after war had again broken out in 1778 but it was again restored to France by the treaty of Versailles, 1783. The struggle for possession however broke out anew during the Fr revolution but under the peace of Amiens 1802 it was restored to France. Then twelve years later St I was finally ceded to Great Britain. In view of its long association with France it can be well understood why a map of St I discloses so great a proportion of Fr names e.g. Port Micoud, Peshin, Souffrier, Laborie Bay, Gros Islet Bay, Castries. In 1940 the U.S.A. leased a site at Gros Islet Bay as a naval air base and an Amer aerodrome and military base was established. *Vieux Fort* Pop 73700. See Capt T. Southey *History of the West Indies* (3 vols.) 1827 and H. H. Breck, *History of St Lucia* 1944.

St Luke's Summer, see INDIAN SUMMER.

St Maixent, tn of W France in the dept. of Deux Sevres 14 m N.N.E. of Niort with manufs of knitted goods, hosiery, etc. There is a twelfth century abbey church which after being destroyed by the Protestants was restored in the seventeenth century. Pop 1100.

St Malo, tn and seaport in the left of Ile de Vilaine France 21 m N.W. of Rennes by rail. It lies on the r.b. of the estuary of the Rance on the opposite shore of which lies the watering place of Dinard. An important suburb (St Servin) of St M lies across the harbour. The tn proper lies on a rocky is joined by a broad causeway and is still surrounded by its eighteenth century ramparts with remains of much earlier work especially at the Grand Port with two fifteenth century towers and the remains of the tower of the great keep. There are many fine sixteenth and seventeenth century stone houses grouped in winding narrow streets round the cathedral with its fine modern stone spire forming a most picturesque view especially from the sea. St M is an important tourist resort and has a good shipbuilding industry. The trade of the port is extensive exporting vegetables and fruit to England and importing coal and timber. The bay is strongly defended by modern batteries on the numerous is off the coast. The newer docks still bear the eighteenth century forts, now abandoned. During the Amer advance into Brittany, following the allied victory in the battle of Normandy 1944, the Ger commandant of St M stood a short siege but the Amers eventually took it without

help thereby compelled to destroy the tn though it suffered some damage. On Grand Bay is the rock tomb of Chateaubriand, and the tn has statues of him and of Duguay Trouin, and Surcouf the privateer. Pop 11300.

St Margaret's Hope, see RONALD-BAY.

Saint-Mars, Marquise de Poilon de, see DASH COMTESE DE.

St Martin I is of the W Indies in the Lesser Antilles between Anguilla and St. Bartholomew. Twenty sq m of the is belong to France and form a dependency of Guadeloupe and 18 sq m to Holland forming with St. Eustatius and Saba a dependency of Curacao. It is triangular in shape with an area of 38 sq m and rises to a height of 1240 ft above the sea. The Fr cap is Maricot and the Dutch cap is Philipsburg. The is has only a small cultivable area. Salt is the chief product of both colonies but cotton and live stock are exported. The is was occupied by Fr filibusters and by the Sp between 1610 and 1615 to which year it was divided between the Fr and the Dutch. The pop of the Fr part is 3200 and of the Dutch 3000. 2 Par and vil. of Guernsey Channel Is. 2 m S.W. of St. Peter Port. Pop 3300.

St Martin's, third largest of the Scilly Isles with an extent of 15 ac. Rude shells are frequently found here. Pop 110.

St Mary, riv. in Canada and the U.S.A. It connects the lakes Superior and Huron. At Sault Ste. Marie there is a series of rapids and above them the Amer Gov. has constructed a canal with an immense lock. Thus the St. M. S. S. Ship Canal at Sault Ste. Marie, Michigan is said to be the largest ship canal in the world. The Canadian Gov. has also built a canal on its side of the riv. It is not quite so large and has a number of locks. The traffic through the lakes is estimated at some 13,000,000 tons annually and the canals supply the necessary accommodation. See SAULT.

SAINT MARIE

St Marylebone, see MARYLEBONE.

St Mary-le-Bow, Church of, see BOW CHURCH.

St Mary's I Par of Ireland in Co. Wick rd on the Barrow. It contains a part of New Ross. Pop 6300. 2 One of the Scilly Isles 30 m from England and 1 England. It is the largest of the group and the inhab. are engaged chiefly in flower culture. Hugh Town is the cap. Pop 1000. 3 City in Anguilla Co. Ohio, U.S.A. 22 m S.W. of Lima it has machine shops, woollen and flour mills and manufs paper, straw board, carriages, cigars, chains and pumps. There are foundries, spoke and wheel factories, oil wells and natural gas are in the vicinity. Pop 3000. 4 Bor. in Elk Co. Pennsylvania, U.S.A. 142 m S. of Buffalo New York. It has an academy of the St. Benedict Sisterhood. It has creameries, tanneries and flour mills and manufs. sewer pipes, electrical supplies, chairs and has a shipping trade in iron and bricks. Pop 7500.

St Mary's Hospital, Paddington, London, founded in 1845, and opened for the

reception of patients in 1852. It has always been a noted centre of scientific progress. Between the two World Wars a new medical school and a new research dept. were built. In the latter worked Sir Alexander Fleming, discoverer of penicillin.

St Mary's Loch, lake in Selkirkshire, Scotland, 16 m WSW of Selkirk. 3 m long and 1 m broad at its widest, it lies 814 ft above sea level, the little loch of the Lows is separated from it by a narrow isthmus. The Yarrow flows from it. Tibbie Shiel's Inn lies at the head of the lake. The highest point near is Deer Law.

St Maur, see MAUR ST CONGREGATION OF

St Maur-des-Fosses, tn of France in the dept. of Seine on the R. Marne. 3 m S of Vincennes. Pop. 55,500.

St Maurice, 1 Riv. in Quebec, Canada, a trib. of the St Lawrence. It rises in the mts. between the watershed of the St Lawrence and Hudson's Bay, flows from the N. and joins the St Lawrence at Three Rivers. The mouth is divided by two is. It has many tribs, the chief being the Mattawin, Mekimic, Bistonius, and Croche. The riv. is navigable for 70 m above Grande Pile, and is used as a highway for the lumber trade; its waters are also used for the manufacture of wood pulp. The St M. forges date from the seveneenth century. There are big falls at Shawinigan and Grand Mere. The riv. was discovered by Cartier in 1535 and was at first named after Maurice, Poulin, seigneur de la Fontaine, who received the seigniorie some thirty years later. Length 325 m. 2. In, in the cant. of Valais, Switzerland. It possesses a fine old abbey dating from the sixth century, now held by the Augustinians. The gorge of St M. is noted for its beauty. Pop. 2,000. 3. In, in the dept. of Seine, France. It is a suburb of Paris, adjoining Charenton-le-Pont and contains the noted Hospice de Charenton, dating from 1644. Pop. 10,100. 4. See SAN MAURIS ISLAND.

St Mawes's, vil. and yachting resort of Cornwall, England. 2 m E from Looe mouth. Its harbour is from 800 to 1000 yds wide. There is a Henry VIII castle and a ferry at Portloe. St M. is in the port of St Aust. In P. Scotland (q.v.). Pop. 800.

St. Michael and St. George, Order of, see ORDERS OF KNIGHTHOOD.

St. Michael's, or Sao Miguel, is in the Azores, belonging to Portugal. It is the largest is. of the group, area 297 sq m. The is. is volcanic, the highest mt. Azores being 3573 ft. There are numerous hot springs, especially remarkable being the Caldeiras or Olleros, boiling fountains and a boiling muddy crater. The is. produces wheat, grapes and wine. Pop. 137,000. The chief tn is Ponta Delgada (pop. 21,000).

St. Michael's Mount, precipitous mass of granite and slate rock, near St. Mount's Bay, Cornwall, England, and connected with Marazion by a causeway submerged at high tide. It was the seat of a chapel belonging to the abbey of Mont St. Michel

in Normandy, and was a place of pilgrimage. It was long a strongly fortified place, and the castle belonging to the St Aubyns (Baron St. Levan) contains many antiquities. It is identified with probability with the Ictis of Diodorus, an ancient tin port and a well-known trading centre of the Early Iron Age.

St. Michel, or Mikkeli, inland prov. of Finland. It contains numerous lakes, occupying more than one third of the total area, with over 1000 is. The area is 8919 sq m. Pop. 203,000.

St. Michel, Mont, see MONT ST. MICHEL. **St. Michel**, industrial tn in the dept. of Meuse, France, on the r.b. of the R. Meuse. 20 m SSI of Verdun. Pop. 4,000.

St. Michel Salient. The flattening out of the famous St. M. S. on Sept. 12-13, 1918, was one of the outstanding achievements of Gen. Pershing and the Amer. Army during the First World War. This salient was the very heart of the position of the Crown Prince's army, and its position in the Argonne flanked by the heights of the Meuse rendered it almost impregnable against any but flank attacks or sympathetic actions elsewhere. Any threat to it was from the Ger. point of view unthinkable for it backed the Stenay Gap and a successful surprise attack early in the war would probably have had the effect of hurling masses of men into retreat through a mere bottle-neck route. Attacks were made on it in Feb. 1918, the preliminary actions being fierce engagements for the possession of France and Comblès, but at the end of twelve days, hard fighting, the Fr. were thrown out of Comblès. Further operations to capture the Bois de l'Étoile at the E. extremity of the Woëvre were conducted for four weeks, but again the objective was not attained. The Amer. Army accomplished in two days what the Allies had been unable to accomplish previously in a month. But at the same time the conformation of the Ger. line, like a pyramid lying on its side, the point pointing westward of the Meuse, was peculiarly susceptible to a dangerous attack, especially after the withdrawal of the Ger. forces throughout the year 1918. The Ger. at the time of the combined Amer. and Fr. attack had 55,000, or 36,000 bayonets on the St. M. section of the front. The assault was a surprise for it caught the enemy at the moment he was making preparations for retirement. The result of the flattening, at of the salient was that the Ger. line was shortened by some 20 m, a compensating feature of less value in the enemy's waning military power than it would have been earlier in the war. In all the Amers. captured 1,000 prisoners, 200 guns, and a huge quantity of material of all kinds. Besides freeing an additional railway line for the supply of Verdun, namely that flowing the Meuse valley to Commercy and the S., and incidentally added some 150 sq m. of area to that passing back into the hands of the allies. See also AIRCRAFT.

St. Moritz, tn in the canton of Grisons, Switzerland, situated on the lake of its

own name, 25 m N N E of Chiavenna. Its famous mineral springs have caused it to become a popular resort for tourists, who are entertained here in winter with fine skating tobogganing (q.v.) and bob-sledding and in summer by alpine climbing and bathing. It lies at an altitude of over 6000 ft. Pop 4000.

St Nazaire, important port of France, in the dept. of Loire-Inférieure, situated at the mouth of the Loire on the bay of Biscay. Improvements were effected in its harbour to accommodate in the early twentieth century and before 1939 it did a thriving trade (chiefly with England) in exporting poultry, butter, sardines, vegetables and brandy. Shipbuilding and nonferrous metal work engaged in. St N had superseded Nantes as a port on the Loire and before the Second World War was rapidly developing. At the end of 1914 St N became the temporary base of the Brit Expeditionary Force and in 1917-18 part of the Amer Army disembarked here. It was highly organised during the Second World War by the Gers as a submarine base for their forces engaged in the battle of the Atlantic. The base contained not only every kind of facility for the maintenance, arming and repair of U-boats but also the only dry dock on the Atlantic seaboard capable of holding the battleship *Lupat*, and it was towards St N that the *Bismarck* (q.v.) was sinking when she was sunk in May 1941. On March 28 1942 HMS *Campbell* (q.v.) rammed the gates of the *forme d'au* (the dry dock) thereby preserving St N from the *Lupat*. This ramming was part of combined operations on a large scale carried out by a Brit naval force consisting of three destroyers, a motor gunboat, a motor torpedo boat and a number of motor launches under Commander R. J. D. Fisher. The dock was out of action for the rest of the war and the operation takes its place with the raid on *Zeebrugge* in the First World War as a great naval feat of Brit arms. There were many incidents on St N, notably that delivered by the R.A.F. on Feb 28 1943. In 1944 Amer forces attacked St N but the Ger garrison held the port until the general Ger surrender in May 1945. Between 1942 and 1945 St N suffered extremely heavy destruction. In 1948 the pop. numbered 8600 by 1946 this had fallen to 11800.

St Neots, mkt tn of Huntingdonshire, England, on the E Ouse (q.v.) in S of Huntingdon. The mkt place is one of the largest in the E. The par church is a spacious structure of the fifteenth century and has a beautiful pinnacled tower. The seventeenth century bridge over the Ouse connects the tn with Eaton Socon in Bedfordshire. Adjoining the tn on the S is the vil of Lynesbury and at Little Jarford is the electric power station built 1899-41. There was formerly a Benedictine priory of which no traces remain. There are engineering works, a brewery, and other manufacturing works. Pop 5000.

St Nicolas, 1. Fr name of a tn in E Flanders, see SAINT NIKLAAS. 2. Tn

in Belgium forming a W suburb of Liège. It has coal mines and brick-kilns, and possesses an interesting Romanesque chapel of the eleventh century. Pop 9000.

St Nimians, par and vil of Stirling-shire, Scotland, now incorporated with Stirling burgh. The Borestone site of the battle of Bannockburn is in the vicinity and there are mounds of wool-lens, agricultural implements etc. There are coalfields in the area. Area 37.376 ac. Pop (1911) 11800.

St Omer, tn in the dept. of Pas de Calais, France, on the Aa 135 m N of Paris. It was formerly fortified but its ramparts were levelled in 1812. The tn grew up round a monastery founded in the seventh century. Its chief architectural features are the cathedral built between the twelfth and fifteenth centuries and the church of St Bertin which is now in ruins. In the Second World War the fifteenth century tower of St Bertin was damaged but the great basilica of Notre-Dame escaped. The chief industries include the manufacture of tobacco pipes, soap, mustard, beer etc. There are also refineries for oil, sugar and salt. St O was the Brit C. H. Q. from Oct 1914 to March 1916. It was bombed and shelled in 1917. Pop 18200.

Saintonge, mkt prov of France, whose cap was Saintes. It now forms mainly the dept. of Charente-Inférieure.

St Owen, 1. Tn in the N outskirts of Lanes on the same. It is a busy port and industrial centre. Pop 4000. 2. La and vil in the W of Jersey Channel Is. (q.v.) N.W. of St Helier.

St Pincras, par, metropolis and par. hbr in the N of London. Area 694 ac. Pop 140000.

St Patrick, Order of, see under ORDERS or KNIGHTHOOD.

St Paul, volcano is. (alt. 960 ft) in the S of the Indian Ocean 38° 42' S and 155° 1'. It has belonged to France since 1945. Area 351 m.

St Paul, cap of Minnesota, U.S.A. and co. S. of Ramsey, in the Mississippi L. immediately E of Minneapolis with which it is so closely connected that they are often called the Twin Cities. The city embraces 331 ac. A large number of the inhabitants are of Irish descent. John Ireland the first Amer cardinal settled 800 Irish immigrants here and made St. I. the leading Roman Catholic diocese in the U.S.A. There are large flour mills and grain elevators. Its terminals and shops are among the largest in the U.S.A. It has the largest horse market in the U.S.A. and an important cattle trade and is a great meat packing centre. It has also an extensive trade in all food stuffs with large railroad shops on the banks of the riv. Boots and shoes, clothing, fur goods, and lumber foundry and machine shop plants are among the most important manufactures. Printing is a leading industry. The state library has over 100,000 books. The state capitol building, of Georgian marble is one of the finest in America, and it possesses other notable buildings in the city hall and Roman Catholic cathedral.

A short distance from the city are the famous Minnehaha Falls. The State Univ. Agric. College is here located on a farm of over 200 ac. adjoining St. Anthony Park, and here are also the Hamline Univ., founded in 1834 and many other colleges. It has excellent communications, for apart from river transport the Chicago, Milwaukee and St. Paul Railway, Illinois Central, N. Pacific and many other of the great trunk railways, have terminals here, and the railway advantages are far greater than those of most other American cities. The Indian name for the site on which the city stands is White Rock and it was known at one time as St. Peter. First settled in 1839, it became the state cap. ten years later although it did not receive its city charter until 1851. The city grows early in importance, and is with Minneapolis the great centre of the N. W. Pop. 287,700.

St. Paul de Loanda, see LOANDA SAO PAULO DI.

St. Paul's Cathedral, cathedral church of the City of London and the largest Protestant church in England. On the site of the present cathedral two earlier churches were successively erected. There was in early Saxon church destroyed by fire a few years after the Norman Conquest. The Gothic choir which replaced a Norman building, was destroyed in the Great Fire of London in 1666. Very soon after the fire Christopher Wren (q.v.) was appointed one of the commissioners for the rebuilding of St. Paul's. Wren at first was of opinion that the building of a new cathedral should be postponed and restoration proceeded with. It was afterwards found, however, that the state of the building was such that a new edifice was necessary. The new foundation stone was laid on May 7, 1674. The building was completed in 1710 and cost only £748,000. Funds were raised by subscriptions and taxes.

The dimensions of St. Paul's are: length 151 ft., breadth at widest part, 218 ft., breadth of nave 122 ft., length of nave 221 ft., length of choir 168 ft. The highest point of the cathedral the cross on the dome is 363 ft. high. Of interest inside the cathedral are the whispering gallery, the choir stalls carved by Grinling Gibbons and the monuments of Wellington and Nelson. Much preservation work has been done in recent years (1913-1930). Whatever additional strength has been thus given to the dome and its supports there must always be in element of weakness in the soil on which the shallow foundations of the cathedral stand, and great care has to be taken to avoid draining these foundations by adjacent building operations. In a German raid in Dec. 21, 1940, the cathedral was slightly damaged and on May 10 in the following year more severely when the chancel was wrecked.

The Library of St. Paul's. The library of St. P. has a long list, but scarcely anything survives from the period of the old cathedral, when it was rich in illuminated MSS. of the Scriptures and in early ritual books. It is in effect the reaction of the eighteenth century and

after. Two collections went to this new foundation: first the books of Robert Grey vicar of St. Mary's Islington, bought for £500 by the dean and chapter in 1707, and secondly 1892 vols. bequeathed by Bishop Henry Compton in 1713. In 1949 the library acquired from the Kyrle collection a remarkable series of MSS. of mixed character, but notably of the Reformation period on Elizabethan religious hist. These latter may well throw new light on the Tudor epoch when they have been examined carefully.



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ST. PAUL'S CATHEDRAL
From Ludgate Hill

and c. Among other items are a twelfth-century MS. Bible presented by Prior Walter of Melton to Witham, a MS. of the early thirteenth century of an abridged version of the *Moultin super Job* together with commentaries on Ezekiel and the Song of Songs by Gregory the Great, which belonged to the library of Cîteaux, a *Job r Magnus* of Robert Rode, bishop of Chichester, 1396-1411 and three documents of 1424-1429 and 1432 relating to the foundation in old St. P. of the chantry of three priests by Thomas More, dean from 1406 to 1421. Plans were announced in 1919 for the reconstruction of the choir and of St. P. In place of the nineteenth-century records will be erected a baldachino over the high altar to allow an adequate view of the grand sweep of the apse, an arrangement which Wren intended. The apsidal chapel is to become an American memorial chapel, the three windows of the apse are to contain stained

glass with the insignia of the Amer States, and near the high altar a lectern will bear a book containing the names of Amors killed while serving in or from Britain.

See W Dugdale, *History of St Paul's*, 1818, W S Simpson *Chapters in the History of St Paul's* 1881, W Bendham, *Old St Paul's Cathedral*, 1902, W M Sinclair, *Memorials of St Paul's Cathedral*, 1909, L B Chancellor, *St Paul's Cathedral*, 1925 and W R Matthews, *St Paul's Cathedral in Wartime* 1946.

St. Paul's School, London, founded in 1509 12 by John Colet, dean of St Paul's. Formerly adjacent to the cathedral it was burned in the Great Fire of 1666. The present building (the fourth erection) at W Kensington was opened in 1884. Among famous pupils are Camden, Milton, Robert Nelson, Pepys, Marlborough, Chesterton, and Viscount Montgomery. The school is governed according to a scheme of the Charity Commissioners' Foundation scholars number 153.

St. Peter Port, port and cap of Guernsey. Channel Is. on the E coast. It has an excellent harbour. The tn has a predominantly Norman character and is extremely picturesque. In ancient days it was walled for defensive purposes. The house in which Victor Hugo lived during his exile is in Hauteville and is preserved in its original state. There is a fine port church dedicated to St Peter dating from the thirteenth century but half of its ancient stained glass was destroyed in the Second World War. Castle Cornet and Fort George are also historic. The Guille Mills library contains nearly 100 000 articles. There are excellent schools. There are regular steamboat services to England and St P P also possesses an airport. A number of the inhab are the descendents of Irish immigrants who were attracted here in the 1850s when the stone trade was revived. Pop 18 000.

St. Peter's church on the Vatican hill in Rome, and the scene of public papal functions built on the site of the reputed tomb of St Peter and on that of the basilica erected by Constantine and Helen in the early fourth century. The present building was begun in 1450 and finally consecrated by Pope Urban VIII in 1626. It is the largest church in Christendom covering an area of more than 26 000 sq yds; the interior is over 200 yds long the transept 130 yds, the nave 150 yds, and the dome 139 ft in diameter and 300 ft high. There are thirty altars. See further under Rome and also ARCHITECTURE. *The Renaissance*.

St. Peters 1 Municipal suburb 4 m S of Sydney New S Wales Australia Pop 6 000 2 Suburb of Adelaide S Australia Pop 9000.

St. Petersburg, see Leningrad.

Saint-Pierre, Jacques Henri Bernardin de (1737-1814) fr writer b at Havre. He served some time in the Engineers and in 1765 returned to Paris having previously visited Malta, St Petersburg, Warsaw, Dresden and Berlin. He was greatly influenced by the writings of Rousseau, his *Études de la nature* (3 vols,

(1784) bearing witness to the fact, but before this he had pub *Voyage à l'île de France* (2 vols 1773), which gained him a reputation for its close portraiture of nature. But his masterpiece was *Paul et Virginie*, a sentimental idyll of love set in Mauritius (St Maurice) which appeared in 1789 and his second success, the novel *La chaumière indienne* 1790. See H d Almeida *Paul et Virginie de Bernardin de Saint Pierre histoire d'un roman*, 1947.

St. Pierre 1 Seaport tn of Martinique on the W coast at the foot of Mt Pelée. Formerly the chief commercial centre of the is it was destroyed in 1902 by a terrible eruption of that mt, involving a loss of over 26 000 lives. 2 In of Reunion the chief on the leeward side of the is has a small artificial harbour. Pop 22 400. 3 Is off the S coast of Newfoundland belonging to France (since 1814 treaty of Paris) which is famous as the centre of the cod fishery. Area 36 sq m. Pop 3600.

St. Poi-de-Leon, tn in the dept of Finistère France 14 m N.W. of Morlaix. It has a Romanesque Gothic cathedral (twelfth century) and the Kruizer church, with a spire 252 ft high. It suffered some damage during the Second World War. Pop 8000.

St. Quentin, tn of France in the dept of Aisne is situated on the Somme 21 m S of Cambrai. It has a beautiful Gothic church dating from the twelfth century, and in *hôtel de ville* erected in the following century. It is an important seat of the cotton industry being noted for its jaconets, tulle, muslin, cottons, and embroidery. Embroidery, silk and woollen goods, sugar and malt liquors are also manufactured. It was the scene of two great battles fought in 1557 and 1813, and suffered damage in both world wars. Being in the direct line between the Belgian frontier and Paris it was overrun by the Gers in their initial advance into France in Aug 1914 during the First World War. It remained within the German until the Tenth offensive of July 1918 drove the Gers well back and beyond the tn. During the Ger withdrawal from the Hindenburg line (q.v.) in Feb 1917 it was hoped to force them beyond St Q but they turned and stood at bay in front of the tn. During the final Ger offensive in 1918 the Gers attacked St Q on March 21. They opened with a terrific bombardment unprecedent in extent and intensity. In this act they had a force overwhelmingly superior to the Brit who after a stubborn fight were forced to give way (see also FRANCE AND FLANDERS. First World War CAMPAIGN in 1917-1918). St Q was also the scene of heavy fighting in the Second World War in 1940 and 1944. Pop 18 000.

St. Raphael, watering place in Var, France 14 m S.E. of Toulon on the Mediterranean. Pop 9200.

St. Remy, tn in Bouches du Rhône France 16 m N.E. of Arles notable for its Gallo-Roman remains. Pop (com.) 6600.

St. Rémy-sur-Durolle, tn in l'uy de-

Dôme, France, 3 m N of Thiers Pop 4300

Saint-Saëns (Charles) Camille (1835-1921) Fr musical composer *b* in Paris



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CAMILLE SAINT-SAËNS

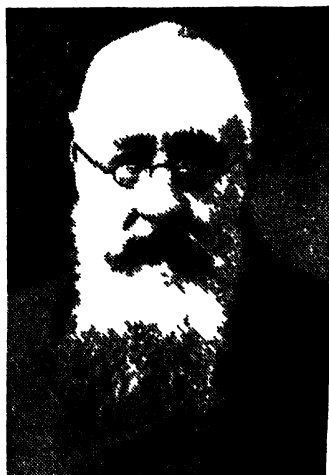
He studied the organ under Benoist and composition under Halévy at the Paris Conservatoire and in 1855 was appointed organist at the Madeleine and four years later prof of the piano at the Ecole Niedermeyer. He had already pub two symphonies and in 1871 with Rouven Bussine he founded the Société Nationale de Musique. His opera *Samson et Dalila* was produced at Vienna in 1877. S-S was a master of technique and a prolific composer but many of his works lack inspiration. Among his other works in addition to much choral, orchestral and instrumental music are the symphonic poems *Dance macabre* (1874) and *La Jeunesse d'Hercule* (1875) the operas *Thérèse Maréchal* (1877) *Henri III* (1883) incidental music for the *Enfance* of Sophocles and the well-known *Carnaval des animaux* (1886 pub 1922). See lives by J Bonnet 1923 and A Dandclot 1930.

St Sampson, or **St Sampson's** port on the is of Guernsey Channel is about 12 m from St Peter Port. There is a granite quarrying industry but it has declined since the introduction in England of road surface tarring. Pop 5600.

Saints, Battle of the, name given to Rodney's victory over the fr fleet under de Grasse near the Saints Is off Dominica on April 12, 1782. Rodney had been keeping vigilant look out from St Lucia,

and when, on April 8 de Grasse set out with a large convoy to join the Sp. ships for a combined attack on Jamaica, Rodney promptly gave chase. De Grasse, retarded by his transport could not elude him and by April 9 Rodney's leading ships were in contact and ought indeed to have been engaged by de Grasse who however lost his opportunity through fear of the Brit gunnery. On the 12th he was forced to come to grips and now luck favoured Rodney, for while the rival fleets were tacking on opposite sides of the Saints the wind changed so as to allow Rodney to sail through the fr line to windward of his adversary. The fr ships isolated in disordered groups became an easy prey to Rodney's guns. De Grasse and his ship were captured together with four other ships, and had Rodney pressed the pursuit as he should have done many more would have been taken. The victory though not complete did much to restore Brit prestige and prevented any further Brit losses in the W Indies. In the development of naval tactics it is notable as the beginning of the end of the rigid rule by which a strict line formation was compelled.

Saintsbury, George Edward Bateman (1815-1933) Eng critic and literary historian *b* at Southampton and educated at King's College School London and Merton College Oxford where he was elected in 1903 honorary fellow. After holding various scholastic appointments he became prof of rhetoric and Eng literature at Edinburgh Univ 1895-1911. He was widely read in the literature of most European nations and was perhaps



GEORGE SAINTSBURY

the leading authority in England on Eng and Lit letters. Of great erudition there was sometimes a tendency for impartiality to be outweighed by his strong personal

tastes He was the author of many standard works, including *A Primer of French Literature* (1880, 1891, 1896, 1912, 1925), *Mariborough* (1885), *A History of Nineteenth Century Literature* (1750-1895) (1896), *Sir Walter Scott* (1897), *A Short History of English Literature* (1898), *The History of Criticism and Literary Taste* (1900-4), *A History of English Prosody from the Twelfth Century to the Present Day* (1906-10), *A History of English Prose Rhythm* (1912), *The English Novel* (1913), *A First Book of English Literature* (1914), *The Peace of the Augustans* (1915), *A History of the French Novel to the Close of the Nineteenth Century* (1917-19), *Notes on a Cellar Book* (1920), *A Letter Book and A Scrap Book* (1922), *A Second Scrap Book* (1923), *Collected Essays and Papers, 1875-1920* (1923-24), *A First Scrap Book* (1924), and *A Consideration of Thackeray* (1931). He was also editor of collected eds of Balzac (in Eng. 1895), of *The Temple Fielding* (1902), and *The Oxford Thackeray* (1908). Also of *Minor Poets of the Caroline Period* (1901-21). See Sir W. Watson *Excursions in Criticism* 1893, A. B. Webster *George Saintsbury*, 1931, and J. Olvi, A. M. Clark and A. Muir (ed.) *Memorial Volume* 1945.

Saints' Day, All, see ALL SAINTS' DAY
Saint-Servais, tn in Belgium, just N W of the city of Namur. It has agriculture and minis of pitules and drainage pipes. Pop 8100.

St Servan, seaport tn in the dept of Ille et Vilaine, France adjoining St Malo on the estuary of the Rance. It has an old church, tower and tn hall. Pop 12,600.

Saint-Simon, Claude Henri de Rouvroy Comte de (1760-1825) A writer, philosopher and founder of a socialistic school in Paris. He was a grandson of the duke de S. S. writer of the famous memoirs. He fought on the side of America in the War of Independence, formed an early scheme for a canal at Panama, and devoted himself and his fortune to various visionary enterprises. Imprisoned for a short time during the 1st revolution, it was not till 1817 that his theories and projects for a reformation of society on socialistic lines were put forward. These are to be found in *L'Industrie* (1816), the periodical *L'organisateur* (1817), *Du système industriel* (1821), *Catéchisme des industriels* (1821), and *Nouveau christianisme* (1825). The basis of his views was a reorganised industrial state or society ruled by industrial instead of feudal class; it was to be an anarchy of business ability and talent. To replace the spiritual rule of the Church and theology he turned to philosophers and scientists. There is no war of class against class, and no root and branch criticism of cap and labour. Christianity in its latest principles is to devote itself solely to the poorer classes and is to be tested by its results in their material, moral and spiritual development. S. S. gathered a few ardent disciples and influenced at various periods such men as Thierry and Comte; he lived a life of privation and hard work after his

own fortune had been spent on his schemes, and died, after an attempt at suicide in 1823, in great poverty. A St Simonian school or society was founded by Infantin (q.v.) and Baraid (q.v.), which proclaimed the enfranchisement of women, community of goods and the abolition of the right of inheritance. Quarrels especially over the free love doctrines of Infantin, led to the dissolution of the society in 1832 (see SOCIATISM). The complete works of S. S. and Infantin were pub in 47 vols., 1863-78. There is a bibliography by H. Fournel (1833). See B. P. Infantin and S. A. Baraid *Exposition de la doctrine de Saint Simon* 1830, P. Janet, *Saint Simon et Saint Simonisme*, 1878, G. Wall *Saint Simon et son œuvre* 1896, S. Charlet *Histoire de Saint Simonisme*, 1896, M. Irooy, *La vie et le tableau du comte de Saint Simon* 1925, and H. Gouhier *La Jeunesse d'Auguste Comte et la formation du positivisme* (vols II and III), 1936-38.

Saint-Simon, Louis de Rouvroy, Duc de (1675-1755) A writer of memoirs, soldier, courtier and politician. b at Versailles son of Claude de Rouvroy, duc de S. S. (1607-33) who was made a peer of France about 1631. He belonged to the famous household corps of Gray Mousketeers fought at Namur and Neerwinden, joined the duke of Orleans and held posts of some importance during the regency on the death of Louis XIV. He married, in 1695, Gabrielle de Durfort to whom he proved a devoted husband till her death in 1745. During his long connection with the court he persevered in collecting a mass of material, varying in the most important details from the highest authorities to mere gossip of the lower servants, which he wrote out during his retirement at La Ferté Villane from 1723 till his death. His writings are partly his own memoirs and partly an amplification of Duc de S. S. *Journal* into whose diary, accurate chronicle he breathed a new life. After his death they were confiscated, 19 state papers by the duke de Choiseul and not pub until 1762 and 1768. The first full ed. was pub in 21 vols in 1829. The best complete eds are those of A. Chéruel (1832) revised by A. M. de Bonis, 1882, 1901. See C. A. Saint-Beuve *Causes de l'indulgence* (vols in index) 1857-62 and lives by J. Caumont 1855 and R. Doumic, 1911.

Saint-Simonism, see SAINT SIMON, COMTE, DU

St Sophia Mosque see under ISTANBUL.
St Stephen port of entry, Charlotte Co., N. S. Brunswick, Canada, opposite Calais, Maine. It has cotton and lumber mills. In 1875 it was in the dist and provides material for wood working industry. It has soap, confectionery, shoe, and pork products factories, and axes and other cle tools are made. Pop 3300.

St Stephen in Brannel, pa and vil in Cambridg, England 1½ m W of St Aveland. Pop 1900.

St Stephens, see under WESTMINSTER

St Thomas 1 W Indian is purchased with the other Virgin Is from Denmark by the U.S.A. for \$25,000,000 in Jan 1917.

It is 38 m E of Puerto Rico and has a fine harbour, but its importance has declined since the rise of Barbados. St T, with St John, forms a municipality with a council of seven members. Discovered by Columbus in 1493 in 1657 it was colonised by the Dutch, who left it, however, for what is now New York giving place to the line twenty years later. It was purchased in 1755 from the Dan W India Company, which had acquired it in 1671. The Brit held the is to 1801 and from 1807 to 1811 when it was restored to Denmark. The historic name for the cap is Charlotte Amalie so named after the consort of Christian V of Denmark. In 1921 the U.S. Geographic Board decreed that it would in future be known as St T, but its more picturesque name was restored to it in 1937. Features of the tn are the so-called Bluebeard's Castle and Blackbeard's Castle two conspicuous towers above the tn. Cowell's Battery near the harbour was named after Maj. Cowell of the Brit Army who died it during the Brit occupation. Sugar was once the prin industry of the is but has run from the bayberry tree (*Pimenta* *acris*) is now almost the sole export. Area 32 sq m. Pop 11,000. 2. Of Sao Tome, an is in the Gulf of Guinea belonging to Portugal 200 m². It is a fertile is of volcanic origin producing coffee, cocoa and rubber. Its cap is St T. Area 320 sq m. Pop 7,000.

St Thomas, Co. of 14 km Ontario, Canada 16 m S of London and 8 m N of Port Stanley on Lake Erie. It is situated in a rich agricultural country. The city is served by the Canadian National (Canadian Pacific) Michigan Central Wabash and Erie Marquette steam rail ways and by an electric railway to London and Port Stanley. The industries include shoes, confectionery, knitted goods, wooden ware, steel, brass and iron foundries, railway workshops and planing mills. Pop 17,100.

St Thomas & Beckett, see BECKETT THOMAS.

St Thomas Aquinas, see AQUINAS THOMAS.

St Thomas Mount, suburb of Madras, India in the Chingleput dist. On the summit of the mt (10 ft) is an old Portuguese church where the famous 'Mount Cross' supposedly of St Thomas the Apostle was discovered in 1547.

St Thomas's Hospital, situated on the E. of the Thames between Lambeth Bridge and Westminster Bridge is the main building in the teaching group which includes the General lying-in, Grovener and Royal Waterloo Hospitals, together with a country branch at Godalming in Surrey. During 1919 17,031 in-patients were admitted to the group and there were 50,197 attendances by out-patients. The first recordable beginnings of St Thomas's were in the priory of St Mary Overie on the present site of Southwark Cathedral which by 1107 included an infirmary for travellers on their way into London and which was named after Thomas Beckett in 1173. After being destroyed by fire in 1212 the

hospital was rebuilt where London Bridge station now stands. In 1540 the hospital was closed at the time of the suppression of the monasteries, but was refounded and granted a royal charter by Edward VI in 1551. Florence Nightingale founded at St Thomas's the first school of nursing in 1860 and in 1871 the hospital was moved to new buildings on its present site. Much damage was sustained by the hospital during the Second World War, and preliminary work has begun on a rebuilding scheme. See 1. G. Parsons *History of St Thomas's Hospital* (3 vols) 1934 and C. Rivers *The Story of St Thomas's 1107-1947*.

St Thomas the Apostle, see THOMAS

St Trond, see STER TROND.

St Valéry-en-Caux, tn of dept of Seine Inférieure, France with sea fishing. Here in 1910 the Brit 1st Highland Div, with 41 troops fought a rearguard action. In 1911 the tn was liberated by the same div, being much damaged in these actions. Pop 2,000.

St Vincent, John Jervis, first Earl (1735-1823), Eng admiral b. at Meaford Staff.fordshire entered the navy as A.B. in 1749 becoming lieutenant in 1755 commander in 1759 and post captain in 1760. In 1783 he was M.P. for Limerick and in the following year for Yarmouth whilst in 1787 he was raised to the rank of rear admiral. He gained an admiral's pension of £3,000 for his part in victory over Spain in 1797 off Cape St Vincent. He was an excellent but strict disciplinarian and overcame a mutiny in the fleet off Spithead by his strong measures. See life by O. H. Sherard.

St Vincent 1. One of the Windward Is group Brit W. Indies Kingdom lat 13° 10' N. and long 60° 07' W. 15 m in length and 11 wide area 135 sq m. Pop 61,660. It includes the Grenadines and is held as a dependency of which the pop is 1900. The other is of the Windwards it is volcanic in origin. Area 12 m wooded mts extends from N to S of the is. At the N. extremity of the mts is the S. of a volcano 1000 ft in altitude the eruption of which in 1902 devastated a large part of the is with the loss of 100 lives. Mt St Andrew (10 ft) in the S. terminates the Kingstown valley. Spurs diverge from the main range most picturesque valleys. The S. called Carib unity is a more level region which formerly was part of the land is chiefly fertile to the E. the climate is healthy and most enjoyable in winter the W. season which lasts from Oct to Nov is hot but not unhealthy. The temp varies from 60 to 88 F. Hurricanes are not uncommon. The Grenadines at a cluster of considerable chain of islands being Bequia, Couva, Mayreau and Mustique. St V. one of the most prosperous of the W. Indies. At wool is its staple industry. Sea fishing is the most in the world bananas sugar rum and mola are also and St V. also produced a mineral. Kings town (pop 6000) the cap is at the head of a bay of the same name on the S.W. coast, sheltered by Old Woman's Point

There is as yet no federal council for the Windwards, each is being a separate colony, but grouped for certain purposes under one governor who is assisted by an executive and a legislative council.

St George's the cathedral church built in 1820 has some fine lancet windows, believed to be by Kempe. The bronze chandelier is said to have been the gift of George III. The botanic garden estab. in 1763, is the oldest institution of the kind in the world, and it was for the purpose of supplying it with specimens of the bread fruit tree that Wm. Bligh made his famous voyage in the *Bounty* in 1787. Other small trees are *Georgiaville* on the E coast and *Edinboro* Villa Calliaqua, Belair and Marriqua.

St V was discovered by Columbus in 1498 on Jan 22 or St Vincent's Day in the Sp calendar. It remained however in Carib hands till the early seventeenth century when Charles I included it in the wide grant made to the earl of Cork. In 1668 Francis Lord Willoughby made a treaty by which the Caribs acknowledged themselves to be the subjects of the Eng king. In 1722 St V was granted by George I to the duke of Montagu whose title indeed could be traced back to the Carib grant. The duke sent out a party of colonists but in view of Fr objections the is was declared neutral under the treaty of Aix la Chapelle (1748). But in 1762 the is was seized by Gen Monckton and Eng colonisation was organised the general himself securing a large grant of land which he sold later for £30 000. The partitioning of the lands led to disputes with the Caribs who now refused all glance but in 1773 another treaty was made with them by which in return for the large tract of land mentioned above they again acknowledged Eng supremacy. In 1779 in the war with France the is was surrendered to the Fr but restored to England in 1783 by the treaty of Versailles. During the Fr revolution it was overrun by the Caribs with the help of the Fr, in what is known as the Brigands war. The Carib hills were laid waste houses pillaged and the colonists murdered. The survivors were confined to Kingstown. In 1786 Sir Ralph Abercromby suppressed the revolt and the Caribs were deported to Ruanan Is in the bay of Honduras. See C. Shepherd *An Historical Account of the Island of St Vincent* 1831 and Mrs Willoughby Bullock *Cuide Book to St Vincent* 1932. 2. Or **Sao Vicente**, one of the Cape Verde Is the surface is mountainous and the soil unfruitful. It is a submarine cable centre. Arc 17° 59' N Pop 1000.

St Vincent, Cape, a W extremity of Portugal famous for many naval battles. (1) The defeat of Rook by the Fr in 1693. (2) Fought in 1780 in the war of Amer Independence after Spain had joined the Fr Adm Rodney defeated the Sp fleet off Cape V and threw supplies into Gibraltar which with this assistance succeeded in holding out until the siege was finally raised. (3) Fought on Feb 14, 1797, in the Napoleonic wars when Adm Jervis (see ST VINCENT EARL) and Com

modore Nelson won a brilliant victory over the combined Fr and Sp fleets and thereby served partly to dispel the gloom which had settled over England after Napoleon's successful campaign in N Italy and the entry of Spain on the side of France. It was this victory which removed the danger of an invasion of Ireland by the Fr, planned in 1796. (4) The battle in which Napier defeated Dom Miguel in 1833.

St Vitus's Dance, see CHORI.

St Yrieux, tn in the dept of Haute Vienne France. In the vicinity is found kaolin used in the manu of pottery. Pop 100.

Saionji, Kimmochi, Prince (1811-1940), Jap statesman b in Kyoto younger brother to Prince Sinsutsuno Tokudamji. At the age of eighteen he was a leader of volunteers on the side of the mikado in the revolution when the office of the latter regained its real power. He studied in the univ of Paris going there when eighteen and leaving France when thirty-two. In 1881 he entered the diplomatic service and accompanied Hirobumi Ito (afterwards prince) to U.S.A. in 1882 and later joined the first Ito Cabinet as minister of education. Cited marquis in 1884 he was envoy at Vienna in 1885 and at Berlin in 1887. From 1892 to 1896 he was minister of education and acting foreign minister and in 1898 again minister of education. Premier in 1906 and 1911-12 he was created prince in 1920. S was the last of the group of statesmen who piloted Japan through the critical transition from a feudal to a modern state. It was only after he became convinced, after many crises that the bureaucracy could no longer furnish Japan with governments save with the support of a political party that Ito in association with S formed the Seiyukai or Constitutional party of which party S succeeded him as leader a few years later. His influence was mainly exercised in domestic affairs but as the emperor consulted him frequently over the Manchuian affair and the war in China S must share responsibility for the latter day situation of Jap foreign policy.

Saipan is of the Mariana (or Iuluene) Is. It was the seat of government Arc 15° 1' N Pop 35 000.

Sais, old city of Egypt on the (N) Nile branch of the Nile. It was the cap during the 26th dynasty.

Saithe, see COAL FISH.

Sakai, primitive race found chiefly in Sumatra and in S E India and N W Palau. Many cannibals. Eat shelter or tree huts form their habitations and they live on jungle fruits game killed with blowpipes or the axe, and some primitive agriculture. They average about 4 ft 11 in in height and have brown skins and wavy hair.

Sakai, cap of the prefecture of Osaka Honshu Japan 6 m S.W. of Osaka. It manu cottons, silks, cutlery, and bricks. Pop. 141 200.

Sakaria, see SANGARUM.

Sakartvelo, see GEORGIA.

Saké, national beverage of Japan, is a

kind of beer made chiefly from rice and contains about 10 per cent of alcohol. It somewhat resembles sherry in taste, and is of a yellowish colour. The name is said to be derived from Osaka, a town famous for its sake.

Sakhalin, or **Saghalien**, is over 600 m long and from 16 to 120 m broad in the N Pacific separated from the Jap is of Yezo by the strait of L. Ierouse and from Siberia by the strait of Tartary. Two parallel ridges of highlands (Mt Ichara 4860 ft) run N and S. Owing to the raw mists of the sea of Okhotsk which breaks on the N and L coasts to the ice floes and N winds and also to the great belts of conifers which clothe the mt slopes the climate is cold and sunless and cultivation (cereals and vegetables) is only possible during 100 days each year, yet large areas of S are suitable for agriculture and pasturage. The chief rivers are the Tym (230 m) and the Poronai. There is a large forest area of larch and fir trees covering about 8 250 000 ac. Minerals include coal and alluvial gold coal mined in the N averages over 220 000 tons and petroleum output in 1939 was nearly 4 000 000 barrels. Coal and oil are exported through the port of Aikhan-drovsk (pop 18 000). There are some 400 m of railways.

Until the Second World War the portion S of 50° N lat with its herring fisheries belonged to Japan. The area of this portion (Ainu Karafuto) is 13 928 sq m (with small adjacent is 13 944 sq m). The rest (14 668 sq m) belonged to Russia. In 1875 by treaty with Japan Russia obtained sovereignty over the whole as Japan obtained the Kurile Is. In 1905 after the Russo-Jap war Japan acquired the S half of the Is (Karafuto) by the treaty of Portsmouth (New Hampshire). Apart from strategic considerations the importance of the Is lay chiefly in the resources of petroleum in the N part but these were unknown when Japan left Russia in possession of the N in 1905. At Okha (in the N, pop 20 000) the Russians establish a large petroleum industry yielding 10 000 tons a year. In 1925 Russia granted concessions in these oilfields to Japan. On March 31 1914 a Russo-Jap agreement transferred Jap oil and coal concessions in N Sakhalin to the Soviet Union and renewed for five years the fisheries convention, while Russia agreed to supply 50 000 metric tons of oil to Japan annually from the Okha oilfields during the five years following the end of the present war. Finally under the Yalta Agreement of 1945 Russia was conceded the right to retake the S half and the entire is now belongs to Russia, and is a region of the R.S.F.S.R. Pop (1940) 415,000.

Saki, popular name of *Pithecia*, a genus of New World monkeys in the family Cebidae, consisting of five species. These have a well developed pollex and a long non prehensile tail. They are found only in the Amazon valley and Guiana.

Sakkar, see **SUKKUR**

Sakkara, vil of Egypt, near the Nile, 14 m SSW of Cairo, is famous for its

pyramids and its great necropolis. Until the resumption in 1936, by Mr Walter Emery of the excavation of the archaic cemetery at S and his discovery of the great tomb of Hcnaka. Egyptologists had always assumed that the tombs at Abydos were the royal burial places of the First Dynasty. Laperle's opinion however now largely accepted the view that these kings are buried at S and that the so-called tombs at Abydos are really cenotaphs built near the burial place of Osiris and near The city from which the royal lines of the First Dynasty originated. A large tomb excavated here in 1939 is ascribed to the Pharaoh Hor-Aha. Another tomb similar in type, excavated in 1916 is probably that of Queen Merneith who was either the wife of Zc's second king of the First Dynasty, or his daughter and wife of a later king, Udima. The contents of the burial chambers of these tombs have been almost entirely destroyed by tomb robbers who pillaged the chambers probably within a century of the burial and then fired the chambers to destroy the evidence of their sacrilege. Identification of ownership is generally established by inscriptions on the sun-burnt mud sealings of the great pottery wine jars which survived the fire. A large boat grave found on one side of the brick-panelled mastaba seems to confirm royal ownership of the tomb if it be true that only kings and queens were supplied with boat barks among their funerary equipment. These finds may well be of great historical importance for the objects in the tomb of Hcnaka show a higher degree of civilisation at this early period than was previously suspected.

Sakor, see **IGOR**

Sakse, see **SAVO GRAMMATICS**

Sakuntala, character in Hindu mythology heroine of the celebrated drama by Kalidasa trans by Sir Wm Jones in 1781. She was the daughter of Visvamisra and Menaka a water nymph and the wife of King Dushanta by whom she became the mother of Bharata the founder of the glorious race of Bharatas. See Kalidasa's trans of *Shakuntala*, etc in Everyman's Library.

Sakyamuni (Saint Sakya) the hermit the founder of Buddhism (†)

Sal, or **Saul**, Tree *Shorea robusta*, genus of Dipterocarpaceae. It is a large grigarious tree and a native of India growing in the moist tract along the base of the Himalayas and in the rich marshy hills of central India. It attains a height of about 100 ft and the heart wood is brown cross-grained and thickly streaked with dark lines. It is unrivalled for its elasticity and has great strength and durability being much used in India for railway sleepers, railways of bridges and plankings. The timber is also used in shipbuilding. The different kinds of the S yield a yellowish white, or red resin known as dammar or dhur dammar.

Sala, George Au. (†1828-95), Eng journalist, b in London was a contributor to *Household Words* and other papers including the *Illustrated London News*, to which he contributed 'Echoes

of the Week,' from 1860 until 1886. He joined the staff of the *Daily Telegraph* in 1857, and represented that paper in America during the Civil war of 1863 and in France during the war of 1870-71. He founded *Temple Bar* in 1860 and was its editor for the first six years. He wrote books and essays on a wide variety of subjects including many on travel. His most valuable book is on Illogaith (1866). He wrote his own *Life and Identities* (1895). See J. H. Friswell, *Modern Men of Letters*, 1870, and R. Straus *Sala Portrait of an Important Victorian*, 1942.

Sala, tn in Vestmanland, Sweden, 66 m N W of Stockholm. Near by are copper mines and lead mines yielding silver. Pop 9000.

Salad, mixture of green uncooked vegetables, e.g. endive, lettuce, cucumber, usually dressed with cream or oil and vinegar. Tomatoes, radishes, beet root and hard boiled eggs are often added, as well as onion, garlic or leek for flavouring. Luscious lettuce, mustard and cream and other green vegetables are rich in vitamins, especially vitamin C, particularly when uncooked. Their mineral content, notably of iron and potassium is also high. Both factors give it a high food value. The dish should be eaten as soon as it is made, and in preparing it great care ought to be taken to dry the ingredients before mixing. See A. Suzanne (revised by C. Hermann Senn), *A Book of Salads*, 1938, and Bebe Daniels and Jill Allgood *222 Ways of Making a Salad* 1950.

Saladin, or Salah-ed-din Yussuf ibn Ayub (1137-93), sultan of Egypt and Syria b. at Tekrit, on the Tigris. He took part in the expeditions to Egypt in the service of Nur ed din, was appointed vizier, and in 1171 suppressed the Fatimid dynasty and constituted himself sovereign of Egypt. On the death of Nur ed din in 1174, he declared himself sultan and was recognised as sovereign by the princes of N. Syria and in 1187 inflicted a crushing defeat on the Christians at Tiberias. His success caused some alarm, which led to the third crusade and in 1191 Acre fell into the hands of Philip II of France and Richard Cœur de Lion. But although Saladin was defeated and Jaffa and Caesarea retaken, Richard was forced to leave S. in possession of Jerusalem and to agree to a truce. S. died at Damascus. See also CRUSADERS. See also by Yussuf ibn Rafi Eng. trans. 1897, S. Lane Poole, 1898, and C. J. Rosebault 1930.

Salado, Rio. 1 Riv. of the N. Argentine, rising in the Andes, flows S.E. to join the Paraná 240 m N.W. of Buenos Aires. In its upper course it is called the Pasaje and the Valbuena. Length 1000 m. 2. Riv. of Argentine in the prov. of Buenos Aires, which enters the estuary of the Plata in the bay of Samborombon. Length 400 m.

Salamanca, 1 frontier prov. of E. Spain, with an area of 4929 sq. m. It produces wine, oil, hemp and cereals of all kinds, as well as timber in large quantities. Gold, lead, coal and copper have been discovered. Pop 410,000.

2. Cap. of the above prov., on the Tormes, 110 m N.W. of Madrid. It has manufactures of china, cloth, and leather and carries on a good transport trade. It contains a university founded about 1239, formerly one of the most famous in Europe but now declined, an old cathedral a cruciform building of the twelfth century, and a library with 80,000 vols. and amongst modern structures, the magnificent Plaza Mayor, capable of holding 20,000 people, is worthy of mention. In 1937 S., as headquarters of the foreign missions, became the effective cap. of insurgent Spain. Pop 82,500. 3. Tn. of Caturagus co. New York U.S.A. on the Allegheny R. It is a railway centre and has railway repair shops. Furniture, plate glass and last blades are made. There are mill and leather factories and worsted mills. The dist. has dairy and grain farms, and potatoes and hay are important crops. Pop 9,000.

Salamanca, Battle of, fought on July 22, 1812, was one of Wellington's most important victories in the Peninsular war. Wellington, having taken the border fortresses Badajoz and Ciudad Rodrigo for use as bases of operations, marched into Spain in June. After ten days of manoeuvre around S. his adversary Marmont retired behind the Douro, to await reinforcements. On July 1, he took the offensive and by skilful moves forced Wellington to form front to his flank. Both armies then marched parallel to each other Marmont seeking to cut Wellington's line of retreat until the Torres near S. was reached and crossed. On July 22 Wellington had decided to continue the retreat towards Ciudad Rodrigo. Marmont seized the Greater Arapiles to form a post behind which he could move his main body westward in pursuance of the old design of the last six days to turn Wellington's flank, and cut the line of retreat. This move to the left extended the Fr. line in an immense arc which enveloped on both sides the obtuse angle formed by Wellington's main body. There was length, but no depth. At first it seemed that the attack might come from Mauncun in the centre but he stayed still whilst Thiemere on the Fr. left, marched on opening an ever widening gap. The enemy were scattered and entirely out of regular formation, Wellington seized his opportunity and attacked Thiemere. The Fr. left wing thus isolated was then attacked with equal fury by Wellington's right which swooped down on it from the high ground above, while simultaneously a div. under Gen. Lakenham, which had been successfully concealed in the woods emerged and completely surprised the flank and rear of the Fr. left. In half an hour three Fr. divisions were routed and scattered to the winds, Marmont being severely wounded in the effort to repair the blunder he now realised that he had made. The Fr. centre and right, however, resisted gallantly for some time, in the hope of retrieving the day, but were gradually driven from the field by a converging attack from front and flank. The Fr. lost 8000 killed and

wounded, besides 7000 prisoners twelve guns, and two eagles. Allied losses, out of an equal force of about 10 000 were just over 5000. The Fr were saved from even greater destruction by a Sp blunder which allowed them to recross the Tormes unmolested and by Wellington's failure to press the pursuit as strongly as might have been done. The following month Wellington entered Madrid. The victory undermined Fr domination in Spain so seriously that it really accomplished more than was at that stage desirable in view of the situation of the Allies elsewhere, for its very completeness led the Fr to abandon the south of the Peninsula in favour of a concentration of all their armies against the threat of Wellington to Burgos. The fruits of S were in fact largely thrown away. Wellington did not pursue the beaten Fr either fast enough or far enough, moreover having at Madrid a central position between the key Fr armies he did not make full use of that advantageous situation to attack them separately. The concentration was so formidable that Wellington postponed his attempt to capture that fortress and fell back on Ciudad Rodrigo. See Sir C Oman *A History of the Peninsular War* vols. 1902-30.

Salamanders are members of two genera in the amphibian family Salamandridae and subfamily Salamandrinae. All the species are to be found in Europe and W Asia and all possess four fingers and five



SALAMANDER
(*Megalobatrachus japonicus*)

toes. The chief genus is *Salamandra* containing three species known as land S. *S. maculosa* the spotted fire salamander, is black in general colour with yellow stippled sides and a blue under surface, and in length varies from 4 to 8 in. It ejects from its skin a highly poisonous white fluid when it is in fear of attack. It is viviparous, and the young are born as larvae from April to June, in due time it is carnivorous. *S. atra*, the black or alpine salamander, brings forth two well developed young at a birth, *S. caucasica* is peculiar on account of the knobby projection

at the tip of the root of the tail of the male. The S of Japan (*Megalobatrachus japonicus* now *Japonicus*) grows to a length of 5 ft. It is the largest living batrachian. An erroneous belief that the salamander could live in fire led to the concept of a legendary creature of that name in heraldry; it is shown as a long tailed and four legged creature surmounted by flames.

Salamaua, town on the S shore of Huon Gulf, New Guinea opposite Lae (q.v.) from which it is about 25 mi distant. It was used in the Second World War by the Jap as one of their chief forward bases. An Amer force was landed in Nassau Bay 10 mi south of S on June 30 1943, to attack the Mulo defences which barred the way to S. While this force struck inland the Australians before Mulo advanced eastward to join them (July 10). The combined forces aided by strong allied air power took Mulo and advanced in a pincer movement on S but were held up throughout Aug by desperate Jap resistance. The Allies fought their way laboriously forward to the air field outside the town but were again checked by fierce counter attacks. But on Sept 4 under cover of a powerful naval and air bombardment large allied forces landed above the town on the N shore of Huon Gulf and on Sept 14 S fell to the Allies. The remnants of the Jap garrison fled to join the garrison of Lae but that place too soon fell to the Allies. The fall of S and Lae deprived the Jap of their main positions on the Huon Gulf and gave the Allies a firm base from which they could threaten to split the Jap defensive line running through New Britain and N New Guinea (see further under PACIFIC CAMPAIGNS IN SECOND WORLD WAR). In 1946 but little remained of pre-war S, once a busy port in the days of the Morobe goldfields.

Salamis 1 Is of ancient Greece, off the coast of Attica, with an area of 36 sq. m. According to Homer it was the home of Telamon and his sons Ajax and Teucer, but it later became a dependency of Athens. It was the scene of the victory of the Greeks over the Persians in 480 B.C. In modern times its importance rests upon the fact that it contains at S (pop. 12 100) the chief town, the annual and chief rival station of Greece. Pop. 14 500. 2 In of ancient Cyprus on the E coast founded by the Achaeans. It was an important port with a good harbour, and had trade in corn wine oil and salt.

Sal Ammoniac, see under AMMONIA.
Salar Jung, Sir or Mir Turab Ali (1851-1883) one of the greatest of statesmen among Indian native states. Coming from an aristocratic family always closely associated with the administration of the Nizam, in 1933 at the age of twenty-four he became Prime Minister (or Diwan) of Hyderabad a position he retained for close on thirty years. On the death of the Nizam in 1869 he was made regent for the young prince, and in 1876 he visited England in an unsuccessful endeavour to obtain the reversal of the annexation of Berar. During the mutiny he was loyal to the Brit and during his long adminis-

tration he built roads, railways and wells, repressed the unruly irregular soldiery, founded schools and fostered education.

Salazar, Antonio de Oliveira (b 1884), Portuguese statesman b at Santa Comba, son of a poor smallholder he was educated at Coimbra Univ. where he became prof of economics. He entered politics in the 1920s and after the military coup of May 1926 he became minister of finance, but very soon resigned. In 1928 he was again finance minister, balanced his budget and was offered the premiership in 1932 which he organised into a virtual dictatorship of a mildly fascist colour under the 1933 constitution which he introduced and which was accepted by plebiscite in 1933. His purpose has been to reconstruct the Portuguese state along the lines of the *Estado Novo* authoritarian and corporatist. Since 1933 he has carried out reforms in social conditions, developed the industries, and entered on schemes of public works and education. He organised the União Nacional the sole authorised political movement in Portugal together with the Portuguese Legion and Youth Movement. He kept Portugal neutral in the Second World War but made an arrangement with Britain for the use of the Azores against Ger submarines. He has pub *Discursos e Notas Politicas* (193), 44).

Salcombe, watering place of Devonshire, England on the E. of Channel 11 m S W of Dartmouth noted for its mild climate. It is a yachting centre. Pop. 2,500.

Saldanha, Joao Carlos, Duke of (1791-1876) Portuguese statesman and marshal b at Amnhaga grandson of the marquis de Pombal. He fought at Mexico (1810) and helped Brazil against Montevideo (1817-22). He allied with Dom Pedro against Dom Miguel as a moderate constitutionalist and during 1846-56 was alternately leading the gov. and in armed opposition to it. He was created a duke in 1848. He was ambassador to Rome on two occasions, and became Prime Minister in 1870 and ambas. to London in 1871.

Saldanha Bay, on the W coast of the Cape of Good Hope 69 m N N W of Cape Town, it is a fine natural harbour which is at present little used.

Sale, George (c 1617-1736) Eng. orientalist. For sev. years he was connected with the S.P.C.K. for whom he prepared an Arabic trans. of the N.T. His highly paraphrastic Eng. trans. of the Koran with commentary appeared in 1734.

Sale 1. Cr. of Cheshire, England 5½ m W of Stockport. It is a residential suburb of Manchester. Pop. 12,800. 2. Municipal Cor. of Tanilil, Victoria, Australia, at the head of the Gippsland lakes navigation, 127 m E. of S. of Melbourne, it is the centre of a dairy farming and gold mining dist. It is the seat of the Anglican bishop of Gippsland, and has a Rom. Catholic cathedral. Pop. 5,000. 3. Com. in the prov. and 10 m N.E. of the city of Alessandria, Piedmont, Italy. Pop. 8,000.

Sale, law relating to the S. of goods is

codified in the Sale of Goods Act, 1893, and a contract of S. is there defined as one whereby the seller transfers or agrees to transfer the ownership in goods to the buyer for a money consideration (see CONSIDERATION). The difference between a S. and an agreement for S. is that the latter only becomes a S. (or in other words an actual conveyance of goods) when the conditions subject to which the property is to be transferred are fulfilled. As a rule the owner alone can give a good title to goods sold. The chief exceptions are S. (a) by a pawnbroker (q.v.) (b) in market overt (q.v.), (c) by an authorised agent, (d) of a negotiable instrument (q.v.) by the holder. A contract of S. may be in any form, but if the value of the goods sold amounts to £10 the contract is unenforceable unless (a) the buyer accepts and receives the whole or part of the goods, or gives something in earnest to bind the contract or pays a part of the price, or (b) some note or memorandum in writing be made and signed by the party against whom it is sought to be enforced. The word 'acceptance' in the above context has caused difficulty to the courts because it is not here used in its ordinary meaning, but connotes merely that the buyer does or says something which implies a recognition of the contract of S. as for example keeping them for an unreasonably long time, offering to resell. The difference between conditions and warranties on a S. is all important. A condition is a stipulation the fulfilment of which gives the buyer the right and but the breach of a warranty is a *collateral agreement* giving a right to damages only. The ordinary rule is that conditions and warranties cannot be implied but by the Act of 1933 the following conditions may be implied: (1) That the seller has a right or title to all (2) on S. by description that the goods shall correspond to the description and if also by sample that the bulk shall correspond to the sample and (3) that the goods if wanted for and expressed or known to be wanted for a particular purpose shall be reasonably fit therefor. The only implied warranties are (1) that the buyer shall have quiet possession and (2) that the goods are free from any charge or encumbrance in favour of any third party.

Sale, Bill of, see BILL.

Salem 1. Chief t. of Salem dist., Mass. India 10 m S.W. of Madras, with manufs. of cotton cutlery and carpet. There are rich deposits of iron and limestone in the dist. Pop. 123,700. Area of dist. 707½ sq. m. Pop. 2,869,000. 2. City and co. seat of Marion Co., Illinois 70 m E. of St. Louis. Coal is mined, and there is considerable agriculture, fruit particularly being cultivated and giving rise to a fruit drying industry. There are creameries and flour mills, machine and railroad shops, iron bridge works and shoe and underwear factories. Pop. 8,000. 3. City and co. seat of Essex Co., Massachusetts U.S.A. on the N. coast of Massachusetts Bay, 16 m N.E. of Boston; it has manufs. of boots and shoes, leather, cottons, machinery, electric lamps, and

lumber products. It is the oldest tn. in the state (1626) was the home of Hawthorne and Roger Williams and was the scene of the witchcraft trials in 1632. Pop. 11,200. 4 City of Oregon U.S.A., on the Willamette R., 22 m. S. of Portland, the seat of Willamette Univ. (1844) the U.S. Indian Training School and state institutions for orphans and the insane, it has mills of flour, woollens, lumber, foundries, machine shops, paper mills, canneries, printeries, and piano making plants. Pop. 30,900. 5 City and seat of Salem Co., New Jersey U.S.A. 37 m. S.S.W. of Philadelphia, it has canneries, glass works, paper and flour mills, and iron foundries, manulins, dyes, etc. for coverings and canning machinery. Farming is carried on sweet and white potatoes, tomatoes, and asparagus, etc. Pop. 8,600. 6 City in Forsyth Co., N. Carolina, U.S.A., 112 m. W.N.W. of Raleigh forming part of the united city called Winston-Salem. The Salem part has a pop. of 24,000. 7 City of Columbiana Co., Ohio, U.S.A. 70 m. S.E. of Cleveland, it has coal mines, iron and steel works, flour mills, etc. Pop. 12,500. 8 Ger. school in Baden founded after the First World War by Dr. Kurt Hahn, partly on the pattern of Eton and partly on his own original lines. See also GORMOSHOW.

Salep, nutritious powder obtained from the tuberculous roots of *Orchis mascula* and allied species. In water it swells to a jelly and a drink prepared from it was formerly much used. It is still sometimes given to invalids and children.

Salerio 1 Prov. formerly the Neapolitan prov. of Principato Ultramarino in Campania, Italy, produces wheat, flax, hemp, cotton, olives, wine, tobacco, and has Area 1,014 sq. m. Pop. 522,000. 2 City of the above on the gulf of S. 34 m. S.E. of Naples, is the seat of an archbishop (founded 974) and has a cathedral (1084) restored in the baroque style and the ruins of a Roman castle. There is a trade in fruit, cotton, silk, tobacco, wine, and oil. Its trade however is insignificant, and it is notable chiefly for a famous school of medicine which flourished there throughout the Middle Ages and where was the celebrated collection of health precepts in Latin verse known under the name of *Schola Salernitana*, precepts that have given rise to numerous exercises of ingenuity in dogmatic imitations. The school declined rapidly in the thirteenth century after Frederick II had founded a university at Naples and seems to have acquired a kind of posthumous fame for its bogus degree. The university is generally held to have been the earliest in Europe. Its records are collected in H. Rashdall's *The Universities of the Middle Ages* (1895), founded in 1150 and closed by order of Napoleon in 1811. It was specially renowned throughout the Middle Ages, not only for medicine, but also for its schools of law and philosophy. The medical school was begun earlier and indeed was at the height of its fame long before the Dark Ages came to an end. Even in the ninth century the physicians from Salerno enjoyed a special reputation and the city

was known as *Civitas Hippocratica*. The Salernitan school of medicine was a secular institution. Many of the teachers were married and women themselves both taught and studied there; the names of Trotula, Constantia and Stephania were famous among the women priests of the Hippocratic community.

Brit. and Amer. forces landed on the S. beaches on Sept. 9, 1943, and the Amer. 15th Army captured Salerno next day. After this there followed desperate fighting in the S. sector and at one time it almost seemed that the Allies might be compelled to give up their beachhead, but on Sept. 21 the 15th Army opened a new offensive from the south and the situation thereafter improved. Despite the heavy fighting the old town around the cathedral remained undamaged, but the modern southerly end was badly battered. The cathedral itself sustained only slight damage to the roof. Pop. 67,000. See full text under ITALIAN FRONT, SECOND WORLD WAR CAMPAIGNS ON (1943).

Sales, Francis de, see FRANCIS OF SALISBURY.

Salesbury, or Salisbury, William (c. 1250-1300) Welsh scholar. His collection of Welsh proverbs was probably the first book printed in Welsh (1547). He also collected *Ydrwyddau yn Nghlysoedd ydd ydd* (1547) and, with the cooperation of Richard Davies, bishop of St. David's, translated the NT into Welsh.

Salesian Society, The, religious order founded in the nineteenth century by a young priest, Don Bosco, and named after its patron, the bishop of Genoa, S. Francis of Sales. It originated in the night schools opened near Turin in 1841 for the benefit of poor children by Don Bosco. Though opposition was incurred, the schools prospered and under the patronage of King Charles Albert colleges for training boy-artisans were formed. In order to consolidate his work Don Bosco formed his teachers into a religious order which was formally approved by Rome in 1859. Thereafter the development of the work was rapid, and in the quarter of a century following Don Bosco's death his houses were opened in France, Spain, Italy, Belgium, Portugal, the Holy Land, Africa, India, China, etc. with huge seminaries in both N. and S. America. By 1934 it had 343 houses, 11,000 priests, thirty-five provinces with a total of about 100,000 members. Don Bosco was canonized by the Roman Church in 1934. There are even houses in England. See also Don Bosco or L. Autry (1930) and L. A. Forbes (1935). See also H. Cheon, *The Heart of Saint Bosco* (London, 1933) and the *Salesian* (1931).

Sales Management, branch of business management which characterizes the changing pattern of consumer demand, makes the sales forecast on which the production plan is based, and sees to it that the forecast is realized. The functions of S.M. in a competitive economy are usually listed as (1) to determine the products to be made, in what quantities and at what prices, and (2) to create the necessary demand for the goods produced and to

organise their orderly distribution. The need to *manage* sales not merely to promote sales arises from the high cost of tooling up for quantity production. The craftsman in who makes clocks one at a time, and who can lay his assistants off when work is slack need not manage his sales. The manufacturer who is making clocks by the thousand on machinery which costs money even when it is idle who must buy his raw materials on long term contracts and who avoids laying off his skilled operatives in case they find other employment is compelled to manage his sales. He must be in a position to say, with reasonable certainty that he will sell his units at pre-determined times and at pre-determined prices and costs. The sales forecast is based on a pains taking assessment of consumer requirements and distributive facilities. The process of collecting and collating the relevant facts is known as market research. All manufacturers except those who have a guaranteed market must engage in market research. Some use the services of market research agencies. Others maintain their own large staff of market research workers or train their salesmen to report trends in a form which enables a statistician in the sales dept. to produce a sufficient volume of market intelligence. From the sales forecast the sales budget is drawn up and this then becomes the basis on which the other departmental budgets (production purchasing etc.) are built.

In competitive times there is always considerable pressure on the sales dept. to forecast expansively and strive for maximum sales. This follows naturally from the fact that production costs fall as the volume increases and it generates the expansionist drive known as reactive S.M. But when goods take control of industry and raw materials are allocated from bulk purchases, manufacturers are given a guaranteed market for their finished goods. (Often a gov. agency is the sole buyer.) In these conditions S.M. is a dynamic force ceases and is replaced by a process which is better described as distribution management.

Many technical colleges and a few privately owned commercial schools have courses in S.M. Examinations are held by the Incorporated Sales Managers Association. See H. L. L. *Introductory to Sales Management* 1940 H. Whitehead *Administration of Marketing and Selling* 1916 A. W. Willmore *Business Budgets and Judgments* (1941) K. Sutton *The Techniques of Selling* 1941 and L. O. Brown *Marketing and Distribution Research* 1941.

Salesmanship, defence of the producer and distributor against the sovereignty of the consumer. It is 'normal for the overall supply of goods and services to exceed the overall demand. To step up to the rate at which goods are being produced by repetition processes is not in essentially difficult thing to do. When therefore the demand for a particular article is in excess of supply and the producers are enabled to make more than average

profits the race to produce a greater quantity of this and similar articles is a swift one. The point is soon reached at which once again supply exceeds demand (Normally is lost of course when mankind expends its resources in war, or when great areas of the earth's surface are devastated by natural forces.) When supply exceeds demand the seller is the courtier and the customer is the king. If the customer is about to spend money on a need which must be supplied he (or she) usually has a choice of suppliers. If he is ready to spend money to satisfy a want he usually has a choice not only of suppliers but of ways in which the want can be satisfied. For example if he wants to make his garden more attractive he may buy a piece of garden furniture or some bright paint for the fencing or some flowering shrubs. He may need new shoes, but if he wants to join a charabanc party he may satisfy the want before the need. The seller of shoes is in competition not only with other sellers of shoes but with the suppliers of other goods and services which may cause shoes to be purchased less often. He must therefore persuade his potential customers to concentrate their attention for a few minutes on the particular want which he is in a position to satisfy and must then give importance to this want. He does this by S., printed S. (i.e. advertising) to bring potential buyers inside to the point of sale and personal S. to complete the sale in a way which leaves the customer with the feeling that he has received good value and will come again. The phrase the customer is always right sums up good S. in connection with repeat selling goods. It means that the damage which a disgruntled customer might do to a company's good will is greater than the cost of persuading the customer to listen to reason. With goods which are bought only once in a lifetime this is not so important a consideration. The price of these goods is usually so high in relation to the customer's income that the customer is inclined to postpone the purchase and has to be persuaded with an intensity which has become known as high-pressure S. or speciality selling. Most of the new products which make life easier motor cars domestic refrigerators, vacuum cleaners—begin as luxuries which are appreciated only by the few and cannot reach the volume of sales which makes low cost production possible except by 'high pressure' S. Big companies which employ large numbers of salesmen and saleswomen conduct their own training schemes. Technical colleges and privately owned commercial schools have courses in S. Examinations in S. are held by the United Commercial Travellers' Association. See B. R. Canfield *Salesmanship, Practices and Problems* 1910 M. H. Perry, *Salesmanship and the Career for a Man* 1946, F. A. Russell and I. H. Beach *Textbook of Salesmanship* 1949 and K. Sutton *The Technique of Selling* 1949.

Salette-Fallavaux, La., vil. of the dept. of Isère, France which became famous for an alleged apparition of the Blessed

Virgin to two peasant children, McAnlie Calvat and Maximin Giraud on Sept 19 1846. The event caused considerable excitement and La Salette became a centre of pilgrimage. The local bishop Mgr Brullard of Grenoble, authorised the cult after an examination but the Vatican remained silent and controversy raged for many years on the reality of the miracle. In 1852 a new congregation known as the Missionaries of our Lady of La Salette, was founded at the shrine, and has subsequently spread to America, Canada, Belgium and elsewhere. See Verdunay, *La Salette, étude critique*, 1906.

Saley, or **Saleijer**, *Islands*, group of 18 in the Malay Archipelago, belonging to the Netherlands S of Celebes. The chief products are tobacco potatoes, indigo, cotton and horses (chief is Saleyer (250 sq m). Total area 270 sq m. Pop 76 500.

Salford, municipal and par. bor. of Lancashire England, situated immediately to the W of Manchester, from which it is separated by the R Irwell. It is 190 m from London by the Midland Region Railway. It is a modern industrial city engaged in similar manufactures to those of Manchester occupies a central position in the S of Lancashire cotton area is without exception of coal mines and contains the bulk of the docks on the Manchester Ship Canal. S still contains one of the most important weaving concerns in the country. It is a great centre for the allied trades of bleaching, dyeing and calico printing. Brewing is another staple industry. S is also a great centre for the manufacture of rubber goods and water-proofed fabrics. Paper making is another local speciality: the paper mills producing wallpapers newsprint and writing papers. S engineering works cover most branches of modern engineering including the production of machinery for bleaching, dyeing and calico printing machine tools laundry plant lifts fire fighting apparatus etc.

There are many handsome buildings in the heart of the city. Including a fine town hall a building in the Grecian Doric style erected in 1875 and extended between 1873 and 1912. St John's Rom Catholic Cathedral (completed in 1891) the Royal Hospital and the Royal Technical College (1896). Kersall Cell the site of a Cistercian monastery of the reign of St Philip is the only conventual establishment of its kind in the Manchester and Salford dist. It was the bp of Dr John Byrom (1711). There is a museum at Peel Park on the site of the old Park Hill mansion which was acquired with the help of Sir Robert Peel for use as a free library and museum in 1846. The museum has comprehensive archaeological and ethnological collections, and the art galleries contain oil paintings by Rubens Rembrandt Guercino Hondius Kocker J. C. Wilson Reynolds and Gainsborough. There are twenty-seven co-primary schools four modern secondary schools a grammar school and two high schools for girls. In 1941 the Royal Technical College owing to the regional character of its work, became jointly

controlled by a governing body representative of the S corporation and the Lancashire Co Council.

While S was raised to the status of a city as recently as 1926 historically it is the most ancient in S Lancashire. It is recorded in the Domesday Book, and in 1228 Henry III granted S a fair and market. Two years later its feudal lord, Ranulf earl of Chester, conferred on the town a charter which made it a free bor. This charter preserved in S town hall, contains forty lines of contracted Latin, and among its attesting witnesses was Simon de Montfort. In 1390 S came into the possession of Henry of Lancaster (Henry IV). S obtained its charter of incorporation in 1841, and in 1853 Broughton and Pendleton were amalgamated with it. The council was increased to sixteen aldermen and forty-eight councillors and this composition is still maintained. By the Local Government Act of 1988 S became a co bor. Two members are sent to Parliament. Pop (estimated) 178,900.

Salicin, bitter crystalline substance derived from the bark of the poplar and willow. It is used in medicine, especially in the treatment of rheumatism and neuralgia.

Salic Law, code of laws of the Salien Franks or more particularly that Salien law which excluded female heirs from inheriting lands. The so-called S L of France of the fourteenth century was a fundamental pact by virtue of which males only could inherit the throne. Many traces the origin of the S L from the archaic principle of the lifelong tutelage of women whether of their own family or of the husband. It is however, a *saf* *a priori* assumption that in turbulent times when heirship of land or a throne entailed the performance of military duties, males alone could be chosen. Denmark amongst other countries has a S L to day.

Salicylic Acid, or **Ortho-hydroxybenzoic Acid** $\text{HO}(\text{C}_6\text{H}_4)\text{COOH}$, is a white crystalline solid melting point 155°C . It was discovered in 1838 by Piria who prepared it from a substance present in willow bark (*Salix*). Nowadays it is manufactured by the action of carbon dioxide upon heated sodium phenate under pressure. $\text{C}_6\text{H}_5\text{ONa} + \text{CO}_2 \rightarrow \text{HO}(\text{C}_6\text{H}_4)\text{COONa}$. From the sodium salicylate so formed the acid itself is liberated by addition of hydrochloric acid. S A is used as an antiseptic and disinfectant. Its derivatives *aspirin* (*q.v.*) or acetylsalicylic acid, and *alol* (*q.v.*) or phenylsalicylate are important medicaments while *methyl salicylate*, $\text{HO}(\text{C}_6\text{H}_4)\text{COOCH}_3$, is used in mouth washes and liquid dentifrices. S A gives a violet coloration with ferric chloride and on heating with lime yields *phenol* (*q.v.*).

Salu (*Saluo*, dance) 'collectium of priests at Rome originally connected with the worship of Mars and a later one with that of Quirinus. The S Latin name was the earlier collectium the later being called S Agonales or Collini'. They held a solemn festival yearly on March 1, lasting

till March 24, dancing in procession in honour of their god. There was a lesser one in October, at the close of the campaigning season. See Quintillanus 16 Ovid, *Fasts*, iii 260 and W Warde Fowler, *Roman Festivals* 1909.

Salim Nureddin Mohammed, see JAHANGIR.

Salina: 1 Vill in the Lipari Is, Italy, on the E coast of Salina Is, it produces Malmsey wine. 2 Co seat of Saline co, Kansas, U.S.A. on the Smoky Hill R, 108 m W S W of Topeka, has salt springs, gypsum quarries and manufs of iron goods, farm implements, wheat products and has flour mills. It lies in the middle of a rich agric dist, producing grain live stock dairy products poultry and is an important trading and distributing centre. Kansas Wesleyan Univ and St John's Military School are here. Pop 21 000.

Salina Cruz, seaport of Mexico in the state of Oaxaca, 12½ m S S E of Tehuantepec on the gulf of Tehuantepec. It is the Pacific terminus of the Tehuantepec Isthmus Railway. Two converging breakwaters over a mile in length provide a harbour of six hundred ft. In 1907 a new port was opened with a large dry dock but trade has declined considerably since the opening of the Panama Canal. Pop 4700.

Salinator, Marcus Livius, Rom general consul, with L Aemilius Paulus, 219 B.C. fighting with him against the Illyrians. Consul again (207) with C Claudius Nero he defeated the Carthaginians under Hasdrubal at the Metaurus. He was pro consul in Etruria (206-4) and censor (204). See Livy xvii 35, xxii 37.

Saline Plants, or Halophytes, plants which flourish on salt marshes near the seashore, or inland near salt lakes or salt mines where other plants could not tolerate the amount of salt present. Examples are glasswort, saltwort, sea beet and asparagus. They can all grow without salt but when supplied with it are plumper and more fleshy and succulent.

Salisbury, Countess of, wife of the Black Prince, see FAIR MAID OF KENT.

Salisbury, Earl of, see C. H. ROBERT.

Salisbury, James Edward Hubert Gascoyne-Cecil, fourth Marquess of (1861-1947) b in London eldest son of third marquess (see below). As Viscount Cranborne he was in the House of Commons for N.E. Lancashire 1889-92 and for Rochester 1893-1903 when he succeeded to the title. Under secretary for foreign affairs 1900-3 he was Privy Seal 1903-5 president of the board of trade 1905, lord president of the council 1922-24, chancellor of the duchy 1922 lord privy seal 1924-29, and later of the Conservatives in the House of Lords 1925-31. He was on the 1931 committee for Indian constitutional reform.

Salisbury, Robert Arthur Gascoyne-Cecil, third Marquess of (18 0 1903), Eng statesman, b at Hatfield. Educated at Eton and Christ Church, Oxford, he entered the House of Commons in the Conservative interest in 1853, and soon dis-

tinguished himself as a speaker. He married in 1857 Georgina Caroline, eldest daughter of Sir Edward Hall Alderson, a baron of the exchequer, but his father not approving of this step, he had to supplement his meagre income by writing for the press. For the next eight years he was a regular contributor to the *Saturday Review* and in 1860 he began to print articles in the *Quarterly Review*. His writings were as trenchant as his speeches in the House were incisive. In 1865 his elder brother died and he became known by the courtesy title of Viscount Cranborne and was the heir to his father's titles and estates. In the Derby administration of 1866 he was appointed secretary for India in which capacity he showed great ability, while his personality made him a power to be reckoned with in the cabinet. On the death of his father in April 1868 he went to the Upper House. When Disraeli came into power in 1874 Salisbury went to the India Office but in 1875 he went to the Foreign Office where he soon acquired a reputation for knowledge and efficiency. Years before he had pronounced that 'In our foreign policy what we have to do is simply to perform our own part with honour to abstain from a meddling diplomacy to uphold England's honour steadily and fearlessly and always to be prone rather to let action go along with words than to let it lurk behind them.' It was to these principles that he resolutely adhered in office.

Shortly after he became foreign secretary he went with Beaconsfield to the Berlin Congress from which they returned according to the words of the Prime Minister bringing peace with honour. On Beaconsfield's death in 1891 Salisbury became the Conservative leader and when four years later Gladstone was defeated he formed his first administration. He was beaten at the general election of 1895 but was returned to power in the following year as the result of Gladstone's appeal to the country to support the Home Rule Bill which had been thrown out by the secession of the party afterwards known as the Liberal Unionists. He held office until 1902 and then again from 1899 until his resignation on July 11 1902, after the close of the Boer War.

Salisbury was a very able Prime Minister and one of the best foreign secretaries that England has ever had. An aristocrat to the tips of his fingers he was inclined to hold himself aloof from the members of his party and though he was admired it is doubtful if he was understood by the country at large. He was an upright, reliable large minded man. See lives by S. H. Jones 1899-96, H. D. Trill 1900, and J. A. Gwynn 1921-31.

Salisbury, Robert Arthur James Gascoyne-Cecil, fifth Marquess of (b 1893), b at Hatfield, eldest son of the fourth marquess. Educated at Eton and Christ Church, Oxford, he served with the Grenadier Guards in the First World War. After eight years in the city he was in 1929 elected to the House of Commons as Conservative M.P. for S. Dorset. From 1935 until 1938 he was parli under secretary for

foreign affairs, from which post he resigned in 1938 with his chief Eden in protest against Neville Chamberlain's appeasement policy towards Germany. In the same year he was created Viscount Cecil of Cranborne. During the Second World War S. served as paymaster general (1940); secretary of state for dominion affairs (1940-42, 1943-45); lord privy seal (1942-43); and as leader of the House of Lords (1942-45). In 1941 he was called to the Lords as Baron Cecil of Essendon. In 1946 he was created K.G., and succeeded his father in 1947. Since 1945 S. has led the opposition in the House of Lords.

Salisbury, Thomas de Montacute, seventh Earl of (1358-1428), elder son of John, sixth earl. He attended Henry V. to France, 1415, and took part in the siege of Harfleur and battle of Agincourt. In 1417 he took part in the siege of Caen. Twice ambas. to France, 1414 and 1418. In 1419 he was made lieutenant-general of Normandy and count of Perche. He had already, 1409, received a summons to Parliament as earl, and in 1421 he received back all the dignities forfeited by his father's attainer. Captain-general of the Eng. Army in France besieging Orleans, he was mortally wounded, and after three days died in Nov. 3.

Salisbury, William Longsword (de Longespée), third Earl of (c. 1175-1226), illegitimate son of Henry II., possibly by Rosamund Clifford. He became earl on receiving in marriage, 1198, Ela, daughter and heiress of second earl, from Richard I.; King John made him Warden of the Cinque Ports and Welsh Marches. Privy councillor on the king's side, 1208-11, he witnessed the charter submitting England to the pope. He damaged the Fr. fleet off Damme, 1213. Captured at Bouvines, 1214, by the Fr., he went over to them, but returned to his Eng. allegiance on the accession of Henry III. He took part in the earl of Cornwall's expedition to Gascony, 1225.

Salisbury: 1. City of New Sarum, more generally known as S., co. tn. of Wiltshire, England, lies amid level meadowlands, at the confluence of the Avon with the three small rivs., Nadder, Bourne, and Wylye, and surrounded by hills. It is 82 m. W.S.W. of London, and is served by the W. and S. regions of Brit. Railways. It was moved from Old Sarum at the beginning of the thirteenth century, and built on a settled plan 2 m. below the old citadel by Bishop Poore. The planning is indicated by the many straight and wide streets running N. to S. and E. to W., forming 'chequers' or squares, with a fine open market-place in the centre. A modern city, the headquarters of the military Southern Command, in an ancient setting, S. has developed into the biggest agric. centre in the S.W. of England.

Old Sarum, the prehistoric predecessor of S., is situated on a spur of the chalk downs adjoining the N. boundary of the city. It was occupied by the native folk, who were driven out by Celtic invaders. The Romans occupied it as *Sorbidunum*, the first mention of which is to be found

in the Antonine Itinerary (*q.v.*), A.D. 140-60. Saxons and Danes occupied it at intervals. The Saxons called it *Seorbyrig* or *Saresberie*, and then *Salisbury*. Later it became a Norman tn. There was a Norman castle within an inner bailey, and an outer bailey, surrounded by the city wall, within which were residences and a cathedral (*see SALISBURY CATHEDRAL*). The remains of Old Sarum are now under the care of the Ministry of Works. The Norman inner bailey has been uncovered and there is now revealed almost the complete lay-out of the old fort. tn.

Apart from the cathedral the three oldest churches of the city are St. Martin's, St. Thomas's of Canterbury, and St. Edmund's. The tower and font of St. Martin's are of Early Eng. date, the nave and aisles being of the fifteenth century. The present fifteenth-century Perpendicular church of St. Thomas replaced a thirteenth-century church. From early times it was a chapel of ease to the cathedral. About the end of the fifteenth century the great W. wall and finely carved Tudor roof were added to the nave, and later the remarkable fresco of the Last Judgment over the chancel was executed. St. Edmund's, which adjoins the Council House, is dedicated to St. Edmund of Abingdon, archdeacon of Canterbury. It is part of a large collegiate church which was built in 1407 in replacement of one built in the thirteenth century.

There are many other places of interest in S. Audley House, once owned by Merwin, Lord Audley, is a beautiful building, now used as the church house. 'Ye Halle of John Halle' was built in 1170 by the wool merchant, John Halle. Poultry Cross is believed to have been erected in the reign of Richard II. by a nobleman as an act of penance. It is in the form of an open hexagon with six arches and six piers, heavily buttressed. The Old George Hotel, a building of the time of Edward II. with a remarkably fine roof-tree, which is mentioned by Pepys, was perhaps a lodging for pilgrims to the cathedral. The guildhall is on the site of the fourteenth-century guildhall and city gaol. The present structure replaced a fine four-storied council chamber, which was destroyed by fire in 1780. Completed in 1797, from the design of Sir Robert Taylor, the building was presented to the city by Jacob, second earl of Radnor, whose portrait by Hoppner hangs in the banquetting room. One of the finest examples of timber framing in S. is the house of John A'Port, built in 1225 by a merchant prince of that name, who was six times mayor of the city. The Shoemakers' Guildhall, built in 1638, was added to the timber-framed house left to the Shoemakers' Company by one Philip Crowe, a schoolmaster. This house still overhangs the highway as it did centuries ago. The council house, Bourne Hall, off the London Road, is the historically interesting former college of Saint Edmund. In the grounds is the only remaining portion of the city rampart. In the various rooms of the Council House are many interesting pictures and documents. In St.

Ann's Street is the S. South Wilts, and Blackmore Museum, containing a large and representative collection of local exhibits. The finely timbered Joiner's Hall, also in St. Ann's Street, is one of the old halls of the anct. trade guilds of the city. It is of the Elizabethan period, and was purchased by the National Trust in 1898. The foundation stone of extensions to the S. Diocesan Training College on the site of the old deanery was laid in October 1949. In addition to its busy agric. centre S. has breweries and carpet factories. It is the 'Melchester' of Thomas Hardy. In his comprehensive plan for S. (*Newer Sarum*, 1949) Dr. T. Sharp suggests a long-term solution for traffic and industrial problems. Pop. 33,800. See H. Hatcher, *History of Modern Wiltshire: Old and New Sarum or Salisbury*, 1843, and T. J. Northy, *Popular History of Old and New Sarum*, 1891.

2. Co. seat of Rowan co., N. Carolina, U.S.A., 110 m. W.S.W. of Raleigh. The centre of a farming dist., it has also railway repair shops. Cotton, damask, and bedroom slippers are manufactured; there are knitting mills and wood-working plants. S. has large mattress and rubber tyre factories, and granite quarries are worked, which give rise to a granite finishing industry. Gold, silver, iron, and copper mines are worked. Pop. 19,000.

3. Tn. in Maryland, U.S.A. Pop. 13,300.

4. The cap. of S. Rhodesia, in S. Central Africa, in Mashonaland, 20 m. S.S.E. of Mazoe, on the railway between Lomagundi and Beira. It has a cathedral. Pop. (white) 21,300; (natives) 45,900.

Salisbury Cathedral. The bishopric of Sarum was originally estab. at Sherborne. A cathedral church for the see of Salisbury, commenced at Old Sarum by Bishop Herman, c. 1067, and completed by St. Osmund in 1092 was destroyed by fire. It was rebuilt by Osmund's successor, Bishop Roger. For various reasons, details of which must be read elsewhere, the see was transferred to New Sarum, i.e. Salisbury, where in 1220 Bishop Richard Poore commenced the erection of the present cathedral. It was finished by Bishop Giles of Bridport in 1258, and dedicated to the Virgin Mary. It is a building of uniform Early Eng. design, and thus stands alone among the Eng. cathedrals. The perfect proportions of its style, and the restrained but most beautiful enrichments are perhaps its leading features. The cloisters were added about 1270, and the upper part of the tower and spire c. 1320. When surveyed the building in 1668, and took measures to prevent further settlement of the tower, which was causing the spire to lean slightly. Extensive alterations were carried out in the eighteenth century, and large sums of money have been spent on the repair of the fabric in later years.

It is built in the form of a Gk., or double, cross and measures some 450 ft. in length, about 203 ft. at its greatest width, the prin. transept, and has an area of 55,000 sq. ft. At the intersection of the nave with the prin. transept rises the spire,

which is 404 ft. in height from the pavement, the tallest spire in England, and the most beautiful in the world. The spire, the tower, and the roof below were (1950) in need of repair. There are many interesting monuments, including the base of the shrine of St. Osmund with foramina for the sick. The cloisters, on the S. side, are the finest example in England of the late thirteenth-century style. The close is entered by the four old gates, the High Street, St. Ann's, and Harnham gates, and the private gate to the bishop's palace. In the close are sev. colleges and some beautiful houses, including the college of matrons, provided in 1682 by Bishop Seth Ward as a home for widows of



SALISBURY CATHEDRAL

priests of the diocese; Mompesson House; Hemmingsby House; the Wardrobe; the Deanery; the King's House; the Theological College; the Choristers' School; and the Bishop's Palace. The great wall which surrounds the close on three sides is built of stone from the cathedral church of Old Sarum, and the R. Avon completes the boundary on the remaining side. See G. H. Cook, *Portrait of Salisbury Cathedral*, 1950.

Salisbury Plain, an undulating tract of open downs, in Wiltshire, England, between Salisbury and Devizes, about 20 m. by 16 m. Few places are better known to the forces of the Brit. Empire, it having been a training area for many years. Just after the S. African war (1902) a permanent camp was started at Tidworth, and barracks of a much improved type were constructed. During the First and Second World Wars camps sprang up in various places all round the training area, and hundreds of thousands of soldiers of the empire forces were prepared for active service here. There are service aero-

dromes at Netheravon and Upavon, and the main army establs. are the Royal Armoured Corps camp at Tidworth and the Royal Artillery camp at Larkhill. The plain is the finest open-air museum of archaeology in Britain. It abounds in prehistoric burial mounds and earthworks, particularly of the Bronze and Early Iron Ages, and there are extensive remains of 'Celtic'-type field-systems and of Romano-Brit. settlements. About 6 m. N. of Salisbury is Stonehenge. See E. Noyes, *Salisbury Plain*, 1913; L. N. Grinsell, *The Ancient Burial Mounds of England*, 1936; and Ordnance Survey Map, *Celtic earthworks of Salisbury Plain*.

Salisfuria, see GINGKO.

Salishan, important group of tribes of N. Amer. Indians which occupied the S. half of Brit. Columbia, Vancouver Is., N.W. Washington, Montana, and Idaho. They now number about 18,000, equally divided between Brit. Columbia and the U.S.A. Flatheads, the true S. tribe, are in an agency in Montana.

Salix, genus of deciduous trees and shrubs, known as willows, osiers, and sallows. They are of quick growth, especially in damp situations. The genus is distinguished from populus by the usually erect stems and the entire catkin scales. See also SALLOW.

Salle, Jean Baptiste de la (1651-1719), Fr. priest, canon of Rheims, and founder of the Brothers of the Christian Schools. In 1683 he resigned his canonry, and, with twelve others, took a vow to devote himself for life to the teaching of the poor, being in fact the forerunner of modern primary education. The headquarters of the institution since 1705 has been at Saint-Yon (Rouen). S. was canonised by Leo XIII. (1900). See W. J. Battersby, *De la Salle, Saint and Pioneer in Education*, 1948.

Salle, René Robert Cavalier, Sieur de la, see LA SALLE.

Salloo, Saleo, Sali, or Sia (Arabic, *sla*, sacred), seaport on the W. coast of Fr. Morocco, on the N. side of the mouth of the Bu-Ragreb, opposite Rabat, 108 m. W. of Fez, is noted for its carpets. In the sixteenth century the tn. was the headquarters of the 'Sallee Rovers' (pirates). Pop. (estimated) 52,000.

Sallow (*Salix caprea*), name given to some of the smaller species of the genus *Salix*, with handsome silver and gold catkins, which appear in early spring and are called Palm. See SALIX.

Sallow-thorn, see SALIX-BUCKTHORN.

Sallust, or Sallustius, Crispus Gaius (86-34 B.C.), Rom. historian of plebeian family. He was tribune of the people (52), but was removed (50) from the Senate by the censor Appius Claudius Pulcher, probably as a partisan of Caesar. He was restored in 49 and became quaestor. In 46 he was praetor and accompanied Caesar to Africa (46), and was made by him governor of Numidia. On his return he built a sumptuous palace and the vast *Horti Sallustiani* on the Quirinal, but though charged with having amassed his wealth by oppression and injustice, apparently escaped trial. His chief works

are *Catilina*, or *Bellum Catilinarium*, and *Jugurtha* (the struggle against Jugurtha of Numidia, 111-105 B.C.). The latter, written to glorify Marius and decry the incompetent nobles, is of less historical value than the account of Catiline's conspiracy (63). Only fragments of *Historiarum Libri Quinque* (78-66) survive. There are numerous eds. and trans. in most languages. The best Eng. annotated texts are Sir J. G. Frazer's ed. of Long's *Sallust* (containing fragments of *Histories*, 1884; A. W. Pollard's trans., 1882; and J. C. Rolfe's text, and trans. in the Loeb Library, 1921).

Sallustius (Σαλλούστιος), cynic philosopher and orator of the fifth century A.D., a native of Syria, studied at Emesa, Alexandria, and Athens. He vigorously attacked the theology of the Neo-Platonists.

Sallyport, see POSTERN.

Salmantica, anct. name of Salamanca (q.v.), whence *Salmanticenses*, a school of seventeenth-century Thomists.

Salmasius, Claudius (1588-1653) (the Latinised name for Claude de Saumaise), Fr. classical scholar, b. at Semur, was educated in Paris and Heidelberg, where he adopted the Protestant faith. In 1631 he accepted a professorship at Leyden Univ. It was probably his *Defensio regia pro Carolo I.* (1649), famous because of the stinging rejoinder (*Pro Populo Anglicano Defensio*, 1650) it drew from Milton, that led Christina of Sweden to shower favours upon him when he visited her court in 1650. His commentary on the *Polynistor* of Solinus is also well known but his reputation rests on his pub. of Casaubon's notes on *Augustan History*, with original notes of his own.

Salmon (*Salmo*), genus of important food and sporting fishes, zoologically of exceptional interest on account of their complex life-hist. and ready response to varying conditions of life. The true S. (*S. salar*) occurs naturally only in the N. hemisphere between lat. 42° and 73°; unsuccessful attempts to introduce it into Australian waters have been made. It is normally anadromous in habit, 'running up' rivers to spawn, but its rapid growth is made entirely in the sea, where it feeds mostly upon herrings and other pelagic fish. The popular idea that prawns and other crustacea constitute its main diet, so causing the pinkish coloration of the flesh, is not confirmed by observation. The excellence and value of the S. as a food fish have rendered its preservation the object of constant attention on the part of riparian proprietors and legislatures from earliest times. But for this the numerous natural enemies and the pollution of rivers, combined with the reckless slaughter of seasonable as well as unclean fish for food, would have exterminated it. To make good the loss of stock arising from these and other causes, many fishery boards, and also a few private owners of fisheries, have estab. hatcheries with good results.

LIFE HISTORY.—In Britain there are two main 'runs' of adult fish, in spring and autumn, but if there is sufficient water in the rivers, a considerable number of fish come up from the sea throughout the year.

Spawning takes place in the late autumn and winter within the limits of a period which varies, according to districts, from one to two and a half months. In temps. of from 40° to 50° F. hatching occurs in from 90 to 120 days. The eyes of the embryo appear about the thirtieth day, little black specks in the egg. These periods may be protracted if the weather is colder; if the eggs freeze they die. The female fish does not extrude all her ova at once, but in successive acts as they become ripe, the whole spawning being completed probably in a week or ten days. When first extruded the ova are the size of a small pea, separate, and bright orange in colour; the shedding of his milt on the ova by the male fish causes them to coagulate in mass, but after a short period this disintegrates when the colour will have changed to an opalescent hue. It has been calculated by Buckland and other authorities that the female fish produces about 900 eggs per pound of her weight. Other fish and birds take heavy toll of the eggs and 'alevins,' and later even of the parr. When hatched the little fish is known as an 'alevin'; it is about 1 in. or more in length, and has attached to the underside of the body an umbilical sac containing sufficient nourishment for some fifty days, after which, when the sac has been entirely absorbed, it is known as a parr. The colour is dark olive on the back, extending down the sides in bars upon a paler spotted ground; the belly is whitish. From a parr the fish develops into a 'smolt,' by which time it has assumed the silvery dress of the S. preparatory to its first migration to the sea. Typical growth so far may be taken as: Dec. 1, egg, deposited on the redd; March 10, alevin, hatched out; May 1, fry, 1½ in. length; May 1 following year, parr, 4½ in. length; May 1 following year, smolt, 6½ in. length. The smolt may return to the riv. as a grilse in that same year of its first descent to the sea, but more often in the following year. The results of experiments point to the conclusion that memory leads them back to the parent riv., and not instinct. The growth is very rapid, and varies from 3 lb. to 10 lb. It may spawn on this first return, but more often does not. Systematic marking has shown that only a very small proportion of fish do not return to the parent riv.; some have been taken as far distant as 600 m. from it. As the spawning period approaches a great change in the appearance of both male and female fish is noticeable. They become slimy and tarnished, the male especially being of a dark coppery red colour, and both look emaciated. On the lower jaw the male fish develops a marked upward curving hook, which he uses probably as a weapon in the fight with other males when mating. There are usually two males attendant on one female. After spawning both sexes are extremely exhausted and emaciated, and the mortality is high among the males. Spawned fish are called 'kelts,' and are quite unfit for human consumption, even were it legal to take them. They gradually drop back down from loch or riv. to

the sea in the early spring, and make a very speedy recovery in condition; many have been known to spawn in successive years.

SALMON FISHING.—In rivs. and lochs S. are taken by rod and line with various lures, such as artificial fly, worm, prawn, and the spun phantom minnow or sprat or gudgeon. The most serviceable rod for fly, which is the sporting and satisfying method of fishing, is a built cane one of 14 ft. or thereabouts. The reel should be of the best quality with freely revolving drum capable of carrying some 60 yds. of good quality fishing line, backed with 80 to 100 yds. of less good line spliced to it, so that it runs freely through the rings on the rod. The reel should be provided with a brake, and all parts should be removable to allow for cleaning. Innumerable patterns of 'fly' are to be had; a reliable tackle dealer will always advise as to flies and baits generally with regard to locality and conditions. For spinning, special short steel or cane rods are used in conjunction with special reels and lines, and in some waters prove most effective. Many clubs and associations prohibit use of the prawn, so killing is it in certain states of the water. It seems strange that S. may be caught by these various lures, as it has been estab. almost beyond doubt that they do not feed while in fresh water.

Salmon Angling.—The angler, having selected his fly (or flies) and attached it to the gut casting line, will decide how best to attack the pool to be fished. There are many ways this can be done, but in general he will fish it down, starting where the heavy water of the incoming run tails off into the pool proper. It may be necessary to wade to cover the water efficiently, and if so a long-handled cuff will be found useful as a stick to give support while moving over rough riv. beds; it can be slung over the back when not in use, and there it will be at hand when required to land a fish. The fly should be cast out and across the stream, and the rod point, held fairly low above the water, should be slowly raised and lowered as the fly travels down and across the current till it finally straightens out directly downstream of the angler. Here it should be allowed to hang for a moment before the next cast is made, the angler meanwhile having moved down a foot or two. In this way the whole pool is covered for a likely fish. In heavy water the fish will usually hook itself, but it is as well to make certain of driving home the barb of the hook by a firm strike. To keep all possible strain on the fish while playing it the rod point should be held well up, and it should always be the aim to keep as short a line as may be by leaving the water and getting opposite the fish on the bank. But considerations of depth, current, slope of shore, trees, etc., will determine tactics; in any event, the fish must be kept under as close control as possible, and be prevented at all costs from racing downstream into the pool below, where it may not be easy, or possible, to follow him. When played out and turning over on his side near or on the top of the water, he should be firmly

but gently drawn towards the bank and gaffed, either by the gillie or the angler himself. If there is no gaff or not large enough, the fish when thoroughly exhausted may be drawn to a shelving shore and taken out by talling it, that is, krasping it firmly round the 'wrist' of the tail. In big rivers it may be necessary to fish a pool from a boat, starting at the head of the pool as before, the gillie controlling the boat's movement and letting it drop down a little as the water is covered. Fishing with fly in a loch requires an intimate knowledge of the shores where the S. are known to lie, or much time and effort are wasted. A boat and a man with experience are essential for success. Weather conditions, too, must be favourable: a good wind to raise a big fish wave and to let the boat drift well. Fish hooked are easily dealt with, as they can be followed at will, and so kept under control.

Much the same methods as above are employed in spinning in a river. Harling is done from a boat, and is a common form of fishing in our larger rivers in early spring. It consists of having two or three rods, with flies mounted, placed in the stern of the boat, one each side and one centre. Twenty to forty yds. of line are let out from each reel. Two gillies (usually) work the boat from bank to bank of the pool, dropping downstream a yard or two at a time. Lochs may be fished by trolling from a boat. This method is usually resorted to when conditions for fly are unfavourable, although on Loch Ness, Loch Tay, and Loch Lomond no other method is used for the first run of spring fish. Two rods are used, one out on either side of the boat, with such baits as golden sprat, blue and silver phantom minnow, natural minnow, or even sand eel. The proper length of line to let out must be judged from depth of water to be fished and the speed at which the boat is rowed. A steady movement of the boat, rather slower than fast, should be maintained. Care must be taken to see that baits are spinning freely, and from time to time they should be examined to make sure they are freed from weed or other obstruction.

Commercial fishing.—S. are fished for in the sea and estuaries by means of a net. There is the stake net with the large bags at intervals in its length. The fish, making their way along the coast towards the river mouth, strike these nets and swim along them until they enter the bags, from which they are later taken by fishermen working from a coble or similar boat. There are also the draught nets worked from the shore of the river or its estuary by men with a boat. One end of the net is held on shore while the remainder is paid out over the stern of the boat rowed round in a wide arc until the other end comes back to the shore a short distance from the first. The men then haul on the net, gradually narrowing its area as it comes to shallower water, when the netted fish make a great splashing. The haul is dragged ashore and the fish meet their inglorious end by a knock on the head. The mesh of all nets

is regulated by law. The close times for rod and net fishing are also regulated by law. These vary with different districts: for the rod, from Oct. to Feb., and for the nets from Aug. to Feb. The largest S. authentically recorded as caught in Brit. waters with the net weighed 70 lb.; it was taken in the Tay in June 1870. One of equal weight was caught with the rod in Brit. Columbia. Weights of between 40 lb. and 50 lb. excite considerable interest. For S. industry see CANNING; also CANADA, Fisheries.

See Sir H. Maxwell, *Salmon and Sea Trout*, 1893; Sir E. Grey, *Fly Fishing*, 1907; W. L. Calderwood, *The Life of the Salmon*, 1908; H. Lamond, *The Gentle Art*, 1911, and *The Sea Trout*, 1916 (for colour plates and scales); B. Kinnear, *Flying Salmon*, 1937; A. Bridges, *Modern Salmon Fishing*, 1947; R. Waddington, *Salmon Fishing, or New Philosophy*, 1947; and J. Hughes-Parry, *Fishing Fantasy*, 1949; and report of the Royal Commission on S. Fisheries, and ann. reports of the Fishery Board of Scotland and of Inspectors of Fisheries.

Salmond, Sir John Maitland (b. 1881), Brit. airman. Entering the army he saw service in S. Africa in 1901-2. In 1912 he entered the Royal Flying Corps, becoming an instructor, and reorganising air training. Director general of military aeronautics in 1917, in Jan. of the following year he became head of the air force in France. In 1919 he became air vice-marshal, and was created K.C.B. Commander-in-chief of the R.A.F. in Mesopotamia 1922-24, and of the air defence of Great Britain, 1925-28, he was made chief of the air staff in 1930, retiring three years later with the rank of marshal of the R.A.F. He was made director of armament production at the Ministry of Aircraft Production in 1939.

Salmonides, important family of fishes, with a small adipose fin, without fin rays, between the dorsal fin and the tail. Many species live in the sea, but enter fresh water to spawn, afterwards returning to the sea (*Anadromous*).

Salmon River, in Idaho, U.S.A., rises in the Rockies and Salmon R. Mts., and flows over an irregular course of 450 m. into Snake R., 50 m. above Lewiston.

Salmon Trout, see under TROUT.

Salol, valuable medicinal antiseptic known chemically as phenyl salicylate, $\text{HO-C}_6\text{H}_4\text{COOC}_6\text{H}_5$. It is used in dentifrices and tooth-pastes.

Salome, name of two women mentioned in the N.T. One followed Jesus from Galilee and witnessed His crucifixion from afar (Mark xv. 40), and afterwards visited the sepulchre (Mark xvi. 1). The other S. (Matt. xiv. 6) is presumed to have been the daughter of Herod Philip by his wife Herodias, who had deserted him for his brother Herod Antipas; Herodias instigated her to ask, as a reward for her dancing, the head of John the Baptist (Mark vi. 17). She married (1) Philip the Tetrarch, and (2) Aristobulus, son of Herod of Chalcis. There is an opera *Salome* (1903), the music of which is by Richard Strauss, the libretto being Hedwig

Lachmann's Ger. trans. of Oscar Wilde's play written in Fr.

'Salomon von Golaw,' see LOGAU, FRIEDRICH VON.

Salon, tn. in the dept. of Bouches-du-Rhône, France. It manufs. soap and olive oil, and trades in confectionery almonds. Pop. 13,100.

Salona: 1. Auct. tn. of Dalmatia, now known as Spalato, Yugoslavia, 74 m. S.E. of Zara. It manufs. wool and silk, and exports wine, fruits, and olive oil. It was a city of the Rom. Empire, flourishing in the fourth century A.D., but sacked by the Goths in 535. 2. Tn. of auct. Greece, see AMPHISSA.

Salonika, or **Saloniki**, now **Thessaloniki**, name of a *nomos* (prefecture) and city of Macedonia, Greece. The prefecture has a pop. of 539,600. Tobacco, cereals, opium, cotton, etc., are grown, and minerals, including manganese, antimony, and chrome, abound; carpets are manufactured. The tn. is situated at the head of the gulf of S., in W. Macedonia. Second only to Constantinople as a seaport, it has a spacious harbour (opened in 1901) through which enter the imports of Macedonia and Albania. Grain, flour, chrome, manganese, hides, tobacco, and fennel are among the exports. The strategic importance of the city has been greatly enhanced by the railways, which now link it with Istanbul, Vienna, and Paris, besides Nish, Usküb, and Monastir. There is also an airport. Thessalonika, famous for the Pauline Epistles to its inhab., was the Rom. city on the same site, being so called after a sister of Alexander the Great. The headquarters of the Young Turks prior to the revolution of 1908, S. surrendered to the Gks. (Nov. 1912) during the Balkan war, and is now part of Greater Greece. S. has sev. mosques and churches, but the very old church of St. Demetrius was destroyed in the great fire of 1917 which ravaged the city. The name was changed to Thessaloniki in 1937. On Aug. 30, 1916, a revolution broke out at S. led by the Venizelist deputy, after the Bulgars had seized considerable ter. in Greece. On Sept. 21 a sympathetic revolt broke out in Crete, Mytilene, and other Gk. is., and Venizelos left Athens for S., where he formed a provisional gov. of insurgent Gks., recognised by the allies, which at once declared war on Bulgaria. On June 6, 1917, M. Charles Jonnart arrived at Salamis in a Fr. war-ship as high commissioner for Greece appointed by the Allies. From Salamis he went to S. to co-operate with Sarrail and Venizelos. On the 11th he stated that the Allies were compelled to seek more satisfactory guarantees for the safety of the army at S., and that this could only be found in the restoration of unity in Greece and the revival of true constitutional gov. King Constantine signed an abdication in favour of his second son, Prince Alexander. Pop. 236,500. See also MACEDONIAN FRONT, OPERATIONS ON (First World War) and GREECE, SECOND WORLD WAR CAMPAIGNS IN (1941).

Salonika, Gulf of, is situated in the N.W.

of the Aegean, bordered by Thessaly, Macedonia, and Chalcidice.

Salop, see SHIOPSNIERE.

Salsette: 1. Is. in the Thana dist., N. of Bombay city, connected with the mainland by bridges. It was formally annexed to the E. India Company's dominions in 1782. Thana, on the E. coast, is the chief tn., near which are the cave temples of Kankeri with huge statues of Buddha. S. is 18 m. long and has an area of 245 sq. m. Pop. 100,000. 2. Part of the Portuguese settlement of Gôa, India, exporting coco-nuts, fish, and spices. Pop. 160,000.

Salsify, **Salsaly**, or **Purple Goat's-beard** (*Tragopogon porrifolium*), biennial plant (family Compositae) with grass-like leaves and handsome purple flowers, cultivated for its thick white tap-root which is used as a vegetable. The seed is sown in March or April, in well-dug soil, and the seedlings are thinned to 6 in. apart. The roots are ready for lifting in early autumn. The common goat's-beard is *T. pratensis*.

Salsola, or **Saltwort**, genus of shrubs and herbs (family Chenopodiaceae) with fleshy awl-shaped leaves and small axillary flowers. *S. kali*, the only Brit. species, is a tall much-branched plant, with leaves terminating in sharp spines, common on sandy seashores. Its ash was formerly much used in soap and glass making.

Salsomaggiore, com. in the prov. of Parma, Italy, 17 m. W. of Parma. It is lighted by natural gas, and has mineral springs and petroleum wells. Pop. (com.) 16,800.

Salt, **Sir Titus** (1803-76), founder of Salthaire (q.v.), Yorkshire, b. at Morley, near Leeds. In 1834 he began wool-spinning near Bradford. He was practically the discoverer of alpaca wool or hair, and the first to manuf. this fabric in England. See also ALPACA.

Salt, in chem., a name given to a whole class of compounds of which sodium chloride or 'common' salts is a typical example. Salt may be regarded as compounds derived from acids by the replacement of part or all of the hydrogen of the latter by metals. Thus sulphuric acid (H_2SO_4) forms *sulphates*, e.g. sodium sulphate, Na_2SO_4 , and sodium bisulphate, $NaHSO_4$. Salts are made by neutralising the acid with the appropriate metallic oxide, hydroxide, or carbonate, and in other ways. Sometimes the name S. is applied to compounds as chloride of ethyl, acetate of ethyl, or even to fats like stearin. Sodium chloride, $NaCl$, is a compound of the metal sodium (Na) with the green poisonous gas chlorine (Cl). It is found in large deposits in many dists., e.g. Cheshire (England), Stassfurt (Germany), Wieliczka (Galicia), and the U.S.A. It is also present in the dissolved state in sea-water, whither it has been carried by rivs. Synthetically it may be made by burning sodium in chlorine, or by neutralising hydrochloric acid with caustic soda: $HCl + NaOH = NaCl + H_2O$. See also under SODIUM.

There are extensive mines of rock-salt at Wieliczka near Cracow, which have

been worked since the thirteenth century, but the S. is impure, being mixed with clay. The S. beds of Northwich, Cheshire, are also extensive, but, though known at the time of the Rom. occupation, have been worked only from the seventeenth century. Much of the S. used in Great Britain, or exported from it, is raised not from rock-salt, but from S. springs, in Northwich, Barton (Lincolnshire), and Droitwich (Worcestershire). Culinary S. is obtained from such springs by evaporation. Apart from its culinary use and its value as a preservative, S. is used in the manuf. of hydrochloric acid and soda for pottery glazing, and also to preserve the surface of metals from being calcined when being melted. Britain produces about 1,000,000 tons of S. annually. Much S. is produced in India: in 1938, 1,539,600 tons of 9,518,383 rupees in value. The production of S. in India is a gov. monopoly (see *further under INDIA*). Elsewhere in the Brit. Commonwealth there is a great deal of S. in Australia. It is obtained from the S. lakes in the W. and N.W. dists. of Victoria, and from salterns in the neighbourhood of Geelong. Large quantities are obtained from the shallow lakes of S. Australia, chiefly on Yorko Peninsula; and Lake Hart (60 m. N. 120 m. N.W. of Port Augusta, has immense supplies of S. of good quality, but owing to distance from markets they have no economic value. The S. is easily obtained, being merely scraped from the beds of the lakes in summer and carted to the refinery. In W. Australia S. is obtained from depressions in the calcareous sandstones of the coast, which in winter are filled to a shallow depth with S. water; in summer these deposits dry up, leaving a layer two or three inches thick, which is collected and refined. The output of S. in the U.S.A. is no less than 15,000,000 tons annually; S. is produced in commercial quantities in thirteen states, chiefly Michigan and New York. The disinfectant D.D.T. is from S. compounds by ten companies. The total ann. world production of S. is about 200,000,000 tons. It is used as a condiment, for preserving food, as a dressing for the soil, and in many chemical industries.

Salta, prov. and tn. of the Argentine Republic: 1. The prov., lying immediately to the south of Bolivia, has an area of 62,511 sq. m. The surface is mountainous, the lowest part being 2400 ft. above sea level. It has some fertile valleys and well-wooded pasture lands, and is watered by the Bermejo and Jaramiento Rs. The chief agric. products are maize, coffee, sugar, wheat, oats, the vine, tobacco, etc. It also has considerable mineral wealth, and in April 1913 a vast petroleum field was discovered. Other minerals, including silver, gold, lead, copper, lime, and marble exist and offer good prospects. Pop. 290,100. 2. Cap. of the above prov., about 1000 m. by rail from Buenos Aires. The environs are hilly and remarkably beautiful. The tn., which stands 3900 ft. above sea level, is on the R. Arias in the Lerma valley. Many of the buildings still retain some of the charm of their

colonial origin. S. is the seat of a bishop and has a national college, custom house, and various religious buildings. It carries on a large trade with Bolivia, especially in cattle and sugar. A railway connecting S. with Antofagasta, Chilo (550 m.), was completed in Feb. 1948. Pop. 44,000.

Saltire, vil. in the W. Riding of Yorkshire, founded by Sir Titus Salt (q.v.) in 1853, for his great alpaca works. It is included in the administrative dist. of Shipley (q.v.). Pop. 1740.

Saltarello (Lat. *saltare*, to jump), lively dance, originating in the Rom. Campagna before the sixteenth century, similar in style to the tarantella, though rather less boisterous. The proper accompaniment to the dance is the *campogna* (bagpipe) or the mandoline. The dancers take the floor one couple at a time, following certain basic steps but largely improvising. One version pantomiming courtship may be the origin of the dance of Harlequin and Columbine. The S. was at one time popular throughout Europe as a complementary dance to the slow and stately *parane* or *passamezzo*, contrasting in mood and rhythm. Many composers have used saltarelli in orchestral works, e.g. the last movement of Mendelssohn's 'Italian' Symphony, Op. 90.

Saltash, bor. and mkt. tn. in Cornwall, England, 4 m. N.W. of Plymouth, on the R. Tamar. There is a cattle market. Edward, the Black Prince, granted the bor. its first charter. Brunel built the 2240-ft. railway bridge across the Tamar to St. Budeaux. Pop. 7200.

Saltburn, watering-place in the N. Riding of Yorkshire, 12 m. S.E. of Hartlepool. It has a fine sandy beach, 8 m. in length. Pop. 7300.

Saltcoats: 1. Police bor., residential tn. of N. Ayrshire, Scotland, 1 m. S.E. of Ardrossan, on the firth of Clyde, 30 m. S.W. of Glasgow. From the end of the seventeenth to the beginning of the nineteenth century, salt was manufactured on a large scale. It has fine sea-bathing, and is a popular holiday resort. Pop. 12,500. 2. Vil. in the prov. of Saskatchewan, Canada, on the Canadian Pacific Railway, 65 m. from Birtle. It is an agric. dist., and has grain-cleaning factories. Sashes and doors are manufactured. Pop. 500.

Salter, Sir (James) Arthur, b. 1881 at Oxford, educated at Oxford High School and Brasenose College; (Oxford prof. of political theory and institutions at Oxford, 1934-44, and independent M.P. for the univ. 1937-50. He was general secretary of the Reparations Commission after the First World War, and director of economic and finance section, League of Nations. Knight Commander of the Bath, 1922. In the Second World War he was parl. secretary to the Ministry of Shipping till 1941, and then headed the Brit. Merchant Shipping Mission to Washington. In 1944 became senior deputy director-general of U.N.R.R.A. Since 1947 chairman of Advisory Council to International Bank. His books include *United States of Europe* (1933) and *Personality in Politics* (1947). See F. Brockway, *Bermondsey Story*, 1949.

Salters' Company, ninth in precedence of the London Livery Companies, with more than 120 liverymen. Liberties were granted to the Salters by Edward III., and in 1377 they sent members to the common council. Livery was granted by Richard II. in 1394, though they were not incorporated until 1558. The arms granted in 1530 are: per chevron azure and gules, three covered salts (salt-cellars), argent garnished or, springing salt proper. Queen Elizabeth granted crest and supporters. At least four salters' halls have existed since the first, near that of their fellows the fishmongers, was burned down in 1533. The present hall is in St. Swithin's Lane, E.C.1.

Saltito, city of Mexico, cap. of Coahuila state, 45 m. W.S.W. of Monterey, with which it is connected by rail. It is noted for shawls, has cotton mills, and produces cereals and rubber. Gold, silver, and other metals occur, and coal is mined. The chief buildings are a college, atheneum, and the Madero Institute. Pop. 75,700.

Salt Lake City, cap. of Utah, U.S.A., and co. seat of Salt Lake co., is 776 m. E. by N. of San Francisco, and is one of the most important commercial cities of the U.S.A. between Denver and the Pacific coast. It was laid out in 1847 by the Mormons, under Brigham Young, and became a city in 1851. The chief edifices are the Mormon tabernacle and temple, St. Mark's cathedral and other churches, and the federal, city, and co. buildings. There is a mining institute, and here is situated the univ. of Utah (9800 students), also the Latter Day Saints Univ. and a state normal school. Here also are public and state libraries. Its chief industries are the manuf. of sugar, textiles, pottery, boots and shoes, confectionery, tobacco, and cutlery, and there are smelters and a business in minerals and stock. Copper mines are worked near by. Pop. 150,000. Great Salt Lake, from which it derives its name, is 11 m. to the S.E., at an altitude of 4218 ft.; it has no known outlet, and its salinity is 20 per cent. See L. E. Young, *The Founding of Utah*, 1924; Federal Writers' Project, *Utah: a Guide to the State*, 1941; W. E. Stegner, *Mormon Country*, 1942; and N. Anderson, *Desert Saints: the Mormon Frontier in Utah*, 1942.

Saltney, pars. (E. and W.), of Flintshire, Wales, 2 m. S.W. of Chester. There are railway works, and manufs. of iron and steel goods and chemicals. Pop. 7300.

Salto: 1. Dept. of N.W. Uruguay. Its area of 4860 sq. m. is fertile and well watered. Cattle-grazing is the chief industry, and fruit and wine are produced. Pop. 100,800. 2. Cap. of the above dept., stands on the Uruguay R., facing Concordia (Argentina), 366 m. by rail from Montevideo, 200 m. from Buenos Aires, and 63 m. N. of Paysandu. There are paved streets, electric lighting, and good suburban roads. It is the centre of agric. interests, besides being an important riv. port. Some 12,000 ac. are under orange-trees. Bee-farming is carried on. Amethysts and agates are found in the vicinity. Pop. 48,000.

Saltetre, see NITRE POTASSIUM.

Salt-producers, see HALOGENS.

Salt Range, group of mts. in W. Punjab, Pakistan, commencing in Chel and culminating in Sakeswar. The highest peak is 2500 ft. above sea level. The range is named from beds of salt at Kheora, in Cambrian strata; above these are carboniferous rocks with a glacial boulder-bed. Elsewhere occur Tertiary strata with fossils.

Salt Water Soap, see under SOAP.

Saltwort, seashore plant (*Salsola kali*), common in Britain. The ashes, like those of the glasswort, yield barilla, a crude carbonate of soda formerly much used for making glass and soap. The leaves are fleshy and end in a spine.

Saltykov, Michael Evgrafovich (1820-1889), Russian author, b. at Spas-Ugol in the gov. of Tver, was the victim of an unhappy boyhood, during which he found solace in reading the Bible. Exiled for eight years to Vyatka because of the liberalism of his writings, he there observed the manners of civil servants, the result being his brilliant *Provincial Sketches* (1856). His rich vein of satire appeared in a hist. of Russia and in *Mesieurs et Mesdames Pompadours* (1875). See N. Sirelsky, *Saltykov and the Russian Squire*, 1940.

Saluki, breed of dog. Recognised by the Kennel Club as a separate breed in 1923, the S., shown on ant. Egyptian carvings, has been a much prized animal amongst the Arabs since sev. centuries B.C., and is the biblical greyhound, hound of the king of Saluk. Resembling in general shape the Eng. greyhound, it has large oval eyes and long ears, covered with long silky hair. Its coat is soft, silky, and smooth, with slight feathering in the backs of the legs, and long feathering on the underside of the tail. The colours are white, cream, golden-red, etc. An extremely distinguished variety, it has grace, intelligence, and dignity, and flourishes in the Eng. climate without difficulty.

Salus, Rom. goddess personifying health, prosperity, and the public welfare, almost identical with the Gk. 'Hygieia' and the Sabine 'Strenia'. Her temple on the Quirinal Hill (founded c. 307 B.C.) was adorned with paintings by Quintus Fabius Pictor. See W. Warde Fowler, *Roman Festivals*, 1908.

Salisbury, Hester Lynch, see PROZIO.

Salât, fles du, group of is. in Fr. Guiana, three in number, viz. St. Joseph, Île Royale, and Île du Diabolo. In the last-named Dreyfus was imprisoned 1891-99.

Salutations are customary forms of address at meeting and parting and on occasions of ceremony. The word is the Lat. *salutatio*, coined from 'salve', a Rom. greeting equivalent to 'Health to you!' It is of interest to trace the weakening, if not in the action of greeting, at least in its meaning. Kissing as a salutation among men was once an Eng. custom. Our formal hand-shaking was once a symbol of union and peace as among the first Christians, or of a solemn compact as in the Rom. 'dextrarum junctio.' Giving the right hand of fellowship (Gal. II.) passed

naturally into a salutation throughout Christendom, and spread, probably from Byzantium, over the Moslem world. In the Moslem legal form of joining hands the parties press their thumbs together. The proverb 'Other countries, other customs' is certainly true of S. Thus a Chinaman, unlike Westerners, covers his head as a mark of reverence: a native of the Congo politely turns his back when someone of higher rank addresses him; whilst a Polynesian, in like case, is accustomed to show his veneration by sitting down. See also KISS.

Salute (Lat. *salutare*, to salute), display of honour out of respect for the person saluted. In former times a naval S. consisted in striking the topsails, and for a very long period all ships, of whatever nationality, had thus to S. a Brit. ship of war within the limits of the Brit. power. Since the introduction of guns, S. have been given by firing a number of guns, varying with the rank and importance of the person saluted. S. of a varying number of guns are given to official representatives—nineteen guns to an ambas., seven for a captain or consul—whilst the U.S. S. for the vice-president, a justice of the supreme court, the general of the army, or the admiral of the navy, is seventeen guns. The S. when boats pass each other is tossing the oars, letting fly the sheet, or stopping the engines for a flag-officer or a royal personage, and laying on the oars for a captain. All ships S. the royal standard when used to indicate the presence of royalty. The royal military S. to the sovereign consists in the band playing the national anthem to the end, whilst standards and colours are lowered, and arms presented; for other members of the royal family only the first six bars of the national anthem are played. The colours, when uncased, are saluted by all soldiers. All officers in uniform and in mufti, if known, must be saluted by private soldiers, either with certain weapons, with the right hand, or, if bare-headed or with the hands encumbered, by turning the head in the direction of the person saluted. There are movements laid down for saluting with swords and rifles, but not with other weapons. Officers must also S. their superiors.

Saluzzo, tn. in prov. of Cuneo, N. Italy. It has an anct. cathedral, communal palace, and other old buildings. Manufs. include leather, hardware, silk, hats, etc. For sev. years the cap. of a marquissate, it was united to the Fr. crown in 1529, and ceded to Savoy in 1601. Pop. 16,100.

Salvador, El, smallest but most thickly populated republic of central America, lies between Honduras and the Pacific, with Guatemala on the N.W. and the gulf of Fonseca on the S.E. From the narrow coastal plain a range of volcanic mts. rises to a height of over 7000 ft., the loftiest peak being Santa Ana (7950 ft.). Between this range and that on the N. frontier is a fertile valley, the most densely populated part of the country. Many of the volcanoes are still active, notably Izalco, near Sonsonate, and earthquakes are frequent; in 1919 an earthquake

did great damage in sev. tns., including the cap. There are sev. picturesque lakes, L. Coatepeque being a popular holiday resort. Rio Sempa, the chief riv., is navigable only for small craft. The climate is healthy, the soil fertile. The people are mainly of Indian or mixed race and are engaged chiefly in agriculture, 80 per cent of available land being under cultivation. They grow coffee, which formed 83 per cent of the exports in 1941 and is sold chiefly to the U.S.A., indigo, and balsam; also sugar, sisal, cocoa, tobacco, maize, and rice. There are valuable forests, and cattle are reared. El S. is the world's chief balsam producer. Gold, silver, iron, mercury, tin, and copper exist, but are not much worked. In 1943 the exports were valued at £3,500,000, the imports at £3,000,000. San Salvador is the cap.; other tns. are Santa Ana, San Miguel, Ahuachapan, San Vicente, Sonsonate, and La Libertad, which is the chief passenger port, and is 25 m. from the cap. There are some 378 m. of railway, and 353 of motor road, and the Par Amer. highway passes through the country. An air service connects San Salvador with other central Amer. cities. A Brit.-owned railway connects the port of Scajutia with Santa Ana, Sonsonate, and San Salvador. Education is free and compulsory, and there is a national univ.

In 1526 the country was conquered by Pedro de Alvarado, and it was until 1821 a part of Sp. Guatemala. A member of the Central Amer. Federation, 1823-30, in 1841 it became an independent republic. El S. remained neutral during the First World War, and in 1919 joined the League of Nations. A president is elected for a term of four years, and has a Cabinet of five members. Legislative power is vested in the National Assembly, consisting of three deputies for each dept., elected for a year by universal suffrage. El S. is divided into fourteen depts., each under a governor appointed for four years. Sp. is the prin. language, and Rom. Catholicism the dominant religion. Area 13,173 sq. m. Pop. 2,018,900. See P. F. Martin, *Salvador of the 20th Century*, 1912; J. Leiva, *The Republic of Salvador*, 1913; H. G. James and P. A. Martin, *The Republics of Central America*, 1923; M. Vanni, *Salvador*, 1926; M. Arquillo, *El Salvador*, 1928; and M. Angel Gallardo, *El Salvador*, 1915.

Salvadora, genus of evergreen trees and shrubs with racemes of small white flowers. *S. persica*, the toothbrush tree, is believed to be the mustard tree of Scripture.

Salvage in law means the compensation allowed to persons who save a ship, apparel, and cargo, or what formed part of these, or freight, from shipwreck, capture, or similar jeopardy. Towage generally gives no right to S. as distinct from towage fees, and again pilots may be said to be ordinarily entitled to no more than pilotage fees. Salvors have a maritime lien (*q.v.*) over ship, freight, and cargo for their S., and their right takes priority over all other liens which may already have attached to the subject-matter of the

claim. When the shipowner pays the S. in the first instance, he is entitled to recover from the cargo-owners an amount proportionate to the value of the cargo salvaged. The actual amount of S. is assessed as a rule by the Admiralty court, in the absence of any prior agreement between the parties as to the rate of S. The S. money is divided in certain proportions among the owners, captain and other officers, and the crew of the salvaging vessel. In recapture from an enemy the fixed rate of S. is one-eighth the value in the case of warships, one-sixth in that of private vessels. The owner of an aircraft is entitled to a reasonable reward for S. services rendered by the aircraft to any property or persons in any case where the owner of a ship would be so entitled.

In international law, when a captured vessel is recaptured by the owner's fellow countrymen or allies, it does not become the recaptor's original prize (*q.v.*), but reverts to the former owner, subject to the obligation to pay salvage. Under the *Consolato del Mare* (see SEA LAWS) restitution to the owner was due only if the vessel was recaptured before removal to a safe place; if, however, it had been so removed, so that full ownership had passed to the enemy, recapture transferred both vessel and cargo to the recaptor. This principle was recognised by the *anc.* laws of England, Scotland, and France; but an Ordinance of the Long Parliament, promulgated in 1649, ordered restitution to Brit. subjects on payment of S., regardless of intermediate dealings other than adoption of the vessel, etc., into the public service of the captors. This change was adopted in naval prize Acts in 1786 and 1864. So far as the Brit. prize courts are concerned, the rule now is that no neutral may rely on purchasing a Brit. vessel in the enemy's possession until she has been formally condemned as prize in a competent court; but, as between Brit. subjects, not even condemnation operates to extinguish the original owner's title.

Salvaging Ships.—S. is the term used in connection with the refloating or saving of sunken or wrecked vessels. Marine S. has become a science, calling for great technical skill on the part of the engineers. Generally the work of salvaging is carried out from a specially constructed vessel, referred to as a S. ship. On board this vessel are all the special appliances for the work, such as portable pumping plant, driven by electricity or internal combustion engines and capable of discharging thousands of tons of water per hour; electric generators; air compressors; complete diving equipment, including submarine lights, oxyacetylene burners for cutting steel plates under water, drills, etc. There are various methods employed for the salvaging of a ship, depending upon circumstances. One frequently adopted for raising a ship sunk in deep water is the use of lifting-barges, in conjunction with the rise and fall of the tide. When there is insufficient rise and fall of tide cylindrical steel pontoons or caissons are used, each capable of exerting a lift of upwards of 50 tons, depending on their dimensions.

These are filled with water and sunk alongside the submerged vessel, where they are attached to the ends of wire cables placed under the wreck. By means of compressed air the water is forced out of the pontoons, and thus the necessary 'lift' to raise the ship is obtained. Another successful method of refloating ships is for divers to close all the openings round the hull and to force compressed air into the vessel. This drives out the water and gives the required buoyancy. S. operations have extended to *anc.* wrecks of treasure ships as in the case of a Sp. galleon in Tobermory (*q.v.*) Bay.

The functions of the Board of Trade respecting S. and wrecks were transferred to the Ministry of Shipping in 1939, and from the latter dept. to the Ministry of War Transport (now Ministry of Transport) in 1941.

Salvage Corps. London S. C. (estab. 1866) is maintained and administered by fire insurance companies for the purpose of reducing as far as possible damage resulting directly and indirectly from fire and fire-fighting operations. There are three stations: the headquarters, in the city, and branch stations in the N. and S. The staff comprises a chief officer and eighty-three officers and men. All fires in the greater London area at which salvage work is practicable are attended; these average about 2000 per annum. The work carried out includes moving and covering goods with waterproof sheets, diverting and clearing water and preventing it from spreading into adjacent buildings, ventilating the premises, and protecting neighbouring exposures or outside stock. After the fire has been brought under control flooded basements are pumped out, dangerous building features removed, and damaged roofs covered with tarpaulins to protect the contents against the effects of inclement weather. Damaged sprinkler heads are replaced, and the system recharged. The cause of the fire is investigated. If necessary the premises are watched for a time in case of a further outbreak. Similar corps are maintained in Liverpool and Glasgow.

In the U.S.A. S. C. are known as fire patrols, and in New York they are directed by insurance underwriters, but in many states such patrols are controlled by the municipal authority, many of the larger tns. having their own fire patrol. Besides their immediate work of restricting fire damage and the reducing to order of salvaged material, fire patrols advise insurance policy holders in matters of fire prevention, while architects of large buildings carry out their recommendations during construction.

Salvarsan ($C_{12}H_{12}N_2O_5As_2$), *diorydin-midoarsenobenzol*, organic compound discovered by Dr. Paul Ehrlich (*q.v.*) in 1909. It has an immediately destructive action on *Spirocheta pallida*, the germ of syphilis, and since its discovery has been used with great success in cases of syphilis, usually by intravenous injection. S. is also known as 606; a modification called neosalvarsan is known as 914, these being

the numbers of the compounds in a series investigated by Dr. Ehrlich.

Salvation Army, The. Is an international religious movement composed of men and women who, moved by the love of God, seek the spiritual and social betterment of their fellows. Its primary aim is to preach everywhere the gospel of Christ to those untouched by existing religious effort. Wm. Booth (q.v.), the founder of the movement, came with his wife and children to London in the spring of 1865. He was then thirty-six years of age and had been a superintendent minister in the Methodist New Connexion. He resigned from the ministry in order to do the work of an evangelist, and after a brief period in the provinces, joined a small group of like-minded people who were working for the moral and spiritual improvement of E. London. The resulting body was called the Christian Revival Association, and later the E. London Christian Mission. As the work spread to other parts of the country 'E. London' was dropped and, in 1878, came the change of name to The Salvation Army. The general superintendent of the Christian mission became the general, a convenient shortening of a rather cumbersome title; military terminology inevitably followed, a uniform was designed, the *London Standard* appeared, a flag was employed to head street marches, and brass bands became a familiar feature. From the beginning high standards of personal conduct were asked of all who joined the movement. These are still demanded, and all Salvationists must be total abstainers; to hold any local (unpaid) office they must be non-smokers. All profess conversion, and all are pledged to bring whomsoever they can into a like experience of the grace of God. From the first, women were given a place of equality with men, and though at one time the Lord's Supper was administered monthly, the practice of the sacraments was later abandoned. The primary emphasis was laid upon a personal experience of religion. In 1879 the S. A.'s journal, the *War Cry* made its first appearance in London. In the following year a training college for officers was opened and the work was estab. in the U.S.A. Within another ten years Salvationists were at work in Australia, India, S. Africa, Canada, New Zealand, the W. Indies, and nine of the prin. European countries, and thus despite considerable hostility on the part of the churches as well as the opposition of roughs. During the same decade the S. A.'s influence on social conditions began to be felt. The first home for ex-prisoners was opened in Melbourne (Australia) in 1883, and both W. T. Stead and Josephine Butler publicly acknowledged the part which the S. A. played in securing the passing of the Criminal Law Amendment Act two years later.

Catherine Booth died in 1890, but, not to be daunted, Wm. Booth produced his *In Darkest England and the Way Out* in the same year. Nearly a quarter of a million copies were sold, and with the public subscribing liberally, a trust was estab. to cover the various 'Darkest

England' schemes, counterparts of which were also set up in lands outside Britain where the S. A. was at work. Honours of various kinds began to flow in on Wm. Booth, but these he accepted as tributes to the movement which he led. Edward VII. received him in audience, London conferred on him the freedom of the city, and the univ. of Oxford made him a D.C.L. When he died in 1912 the world mourned, and the traffic in London's prin. streets was held up as his funeral procession passed on its way to Abney Park.

He was succeeded by his eldest son, Bramwell (q.v.), during whose generalship the S. A. work was extended (among other fields) to the Celebes (1913), Burma (1915), China (1916), Czechoslovakia (1919), Brazil (1922), and Austria (1927). In 1929 Edward J. Higgins assumed leadership, and certain legal changes were made in the S. A.'s structure. An Act of Parliament provided that future generals should be elected by a high council, and that all properties and assets, hitherto vested in the name of the general, should be held by a custodian trustee company. The work itself was further extended to Uganda (1931), Fr. Guinea (1933), N. Africa (1934), and the Belgian Congo (1935). In 1935 Evangeline Booth, fourth daughter of Wm. Booth, was elected to the generalship, and further new advances were made in Asia and Africa. On the outbreak of the Second World War George Lyndon Carpenter succeeded, and this period proved to be one of difficulty for an international movement. Little direct information could be gained, for example, of what was happening in Germany or Japan. Yet at the end of the war it was found that for the second time in a quarter of a century, the oneness of the S. A. had not merely survived, but had been strengthened, by the severest test to which it could have been subjected. In 1946 Gen. Albert Osborn was elected, and he quickly visited as many fields of labour as possible, renewing the world ties of the movement and rallying its forces where the war had caused the heaviest material losses.

According to the 1950 ed. of *The Salvation Army Year Book*, the work is now estab. in 92 countries and colonies, where 81 languages are employed; 16,847 corps and outposts are in operation, 970 day schools, and 1728 social institutions and agencies, which include 153 goodwill centres, 95 hospitals, dispensaries and clinics, 87 maternity homes, 97 eventide homes, and 121 children's homes. The total world circulation of its weekly and monthly periodicals is 1,791,017, of which the prin. papers and magazines in Britain are the *War Cry* (260,380), the *Young Soldier* (212,470), *All the World* (27,000), and the *Deliverer* (22,000).

See H. Begbie, *William Booth, 1914*; R. Sandall, *History of the Salvation Army, 1920*; S. C. Gauntlett, *The Army—its Origin and Development, 1945*, and *Social Evils the Army has challenged, 1946*; and Midge Unsworth, *Maiden Tribute, 1949*.

Salvemini, *Gustavo* (b. 1873). It. historian. b. at Molfetta and educated at

Florence Univ. He was a member of the Chamber of Deputies from 1919 to 1921. S. was arrested as an anti-Fascist in 1925 and settled in London. Lecturer on hist. of It. civilisation at Harvard (1934). His pub. include *Mazzini* (1915); *The Fascist Dictatorship in Italy* (1927); *Under the Axe of Fascism* (1936); *Italian Fascism* (1938); and *Prelude to World War Two* (1949).

Salve Regina, 'Hail, Holy Queen,' the opening words of the antiphon of the Blessed Virgin used after Lauds and Compline in Trinity-tide. Hermannus Contractus of Reichenau, a Benedictine monk of the eleventh century, is believed to have been the composer of the earliest S. R. Tradition attributes the initial invocation of this antiphon, *O clemens, o pia, o dulcis Virgo Marie*, to S. Bernard of Clairvaux.

Salvia, large genus of ann. and perennial herbs and sub-shrubs (family Labiatae). *S. verbenaca* is the clary or wild sage, an aromatic plant with conspicuous spikes of purple-blue flowers; *S. officinalis* is the sage of herb gardens; *S. patens* and other species are valuable border plants.

Salvianus (fifth century), Christian writer of Gaul, but b. probably at Cologne or Treves; he appears to have studied law. He married Palladia, a heathen; upon her conversion, they agreed to live in continence. About 426 he was one of the tutors to the sons of Eucherius of Lyons. In 430 he was one of the ascetics at Lerins is. in the Mediterranean, under St. Honoratus. Of his writings, there are extant nine letters and two treatises. The latter are *Ad ecclesiam adversum avaritiam* and *De gubernatione Dei* (otherwise *De presentibus judicium*). The former exhorts Christians to leave all their goods to the church; the latter explains the barbarian invasions on the empire as a divine judgment upon imperial wickedness and reward of pagan virtue.

Salviati, Il Cacchino del, or Francesco dei Rossi (1510-63), It. painter, called after his patron, Cardinal S. He was a pupil of Bugiardini, Bandinelli, and Andrea del Sarto (1529). He early painted in Rome, and went to France (1551). His masterpieces include 'Triumph of Camillus' (Florence), 'The Taking down from the Cross' (Paris), and frescoes representing Psyche's story in the Palazzo Grimani. See S. Ticozzi, *Dizionario*, 1800, and G. Vasari, *Lives of the Painters* (trans.), 1885.

Salvinia, genus of aquatic lycopods. *S. natans* is a pretty little plant clothed with small fern-like leaves, and is sometimes grown in the stove-house.

Sal volatile, ammonium carbonate, inhaled as a refresher and restorative.

Salween, or Salwin: 1. Riv. of S.E. Asia, rising in Tibet and flowing principally through Burma in a S. direction, finally entering the gulf of Martaban. It has a total length of about 1800 m., but is not navigable owing to rapids. See also under BURMA, SECOND WORLD WAR, CAMPAIGNS IN. 2. Dist. of Burma, with an area of 2670 sq. m. Pop. 50,000.

Salvini, tn. in the Azerbaijan S.S.R., 28 m. above the mouth of the Kura in

the Caspian. It has important fisheries. Pop. 12,200.

Salzegard, see under OB.

Salzbrunn, name of three adjacent vills. of Polish Silesia, 45 m. from Wrocław (Breslau). There are mineral baths, coal-mines, and manufs. of porcelain and glass. Pop.: Ober-S., 7800; Neu-S., 3000; and Nieder-S., 2500.

Salzburg: 1. Prov. (formerly a crown land and duchy) of Austria, bounded N. by Bavaria, E. by Styria, and S. and W. by the Tyrol and Carinthia. It is mountainous in the W., has grassy valleys and uplands in the interior, and is watered by the Salzach. The rearing of cattle, dairy-farming, lumbering, and the manuf. of malt liquors and cigars are the chief pursuits. There are sev. mineral springs, e.g. at Gasteln. Area 2763 sq. m. Pop. 330,700. 2. Cap. of the above prov., is seated on both banks of the Salzach, 155 m. W. by S. of Vienna. It has a fine cathedral, an old castle, and many industries. Mozart was a native of S., and performances of his operas at S. originated the summer musical festivals which are now an ann. event. Mystery plays are also performed there by the peasants. Pop. 80,000.

Salzkammergut, Alpine dist. in the S. part of Upper Austria, adjoining Styria, forming the drainage area of the Traun above Gmunden. On account of its lakes, Traunsee, Hallstatt, and others, and natural beauty, it has been named the 'Austrian Switzerland.' It has an area of about 210 sq. m.; the best-known resorts are Ischl, Gmunden, Laufen, Gosau, Mondsee, Ebensee, Hallstatt, and Traunkirchen. The prin. lakes are the Zellersee, Kammersee (18 sq. m. in area), Traunsee, Hallstättersee, Grundsee, etc., the region containing in all over forty. The highest mt. points are the Dachstein (9827 ft.), Thorstein (9663 ft.), and Donnerkogel (6730 ft.). There are extensive deposits of salt in the dist., especially at Hallstatt and Ischl. The prov. and tn were overrun by Gen. Patton's Amer. forces in 1945 in the closing days of the war in Europe.

Samana: 1. Tn. of the Patilla and E. Punjab States Union, India, 20 m. S.W. of Patika. Pop. 10,200. 2. Santa Barbara de Samana, seaport of Haiti, on N. of S. Bay, in the Dominican Republic, 64 m. from Santo Domingo. Bananas, coco-nuts, and cacao are exported. Pop. 4000.

Samanians (Samanides or Samani), minor Persian dynasty which ruled in the tenth century (c. A.D. 872-999). Ismail ibn Ahmad, the third of the line, estab. its real power after conquering the Salafids (900). The last of the line, Ismail al-Muntasir, was assassinated in the reign of Mahmood, the Gaznavide (c. 1004). See Michoud, *Histoire des Samanides* (Defromery's trans.), 1845.

Samar, one of the Philippine Is. It forms the prov. of S., with outlying is., and has a total area of 5050 sq. m. It is traversed by a mt. chain, and has dense forests, which supply good timber. The climate is temperate, and soil generally

fertile. Cereals, sugar-cane, rice, coconut, coffee, tobacco, etc., are extensively cultivated, and hemp is exported. Cap. Catbalaoran. Taken by the Jap. early in 1942, it was overrun and its Jap. garrison wiped out by the Amers. in the late autumn of 1944. Pop. 325,200.

Samara, in. on the Volga, see KUTAISHEV.

Samara, or **Key**, dry indehiscent few-seeded fruit with a membranous wing, such as those of the sycamore, ash, and elm.

Samarang, see SEMARANG.

Samaria (Heb. *Shomron*, watch-mountain) (1 Kings. xiii 32). 1. The central prov. or section of anct. Palestine, having Judea on the S., and Galilee on the N. It included the possessions of the tribes of Ephraim and Manasseh. 2. Anct. city and cap. founded by the fifth king of the N. kingdom (Israel), Omri (c. 887-876 B.C.), see 1 Kings, xvi. 24. It was situated on a hill, which rises some 300 ft. above the surrounding valley on all sides except the E., and when fortified presented such an impregnable front that it took even an Assyrian army three years to capture it. Omri and his successor, Ahab (c. 876-853), evidently levelled the top of the hill, banked its sides, and built inner and outer walls around the summit. The city was provided with royal palaces, with a number of large cisterns, and a cemented water pool, etc. In 722-721 B.C. S. was occupied and destroyed by the Assyrian king Shalmaneser II. (721-705). Later it was rebuilt, and in the period of Alexander the Great (who planted Macedonian colonists there, 331 B.C.) it became a Hellenistic city. Herod the Great rebuilt it and greatly enlarged it, honouring the Emperor Augustus both with the city's new name Sebaste (the Lat. title Augustus was rendered in Gk. by *Sebastos*), and with its temple dedicated to him. Particularly impressive were the strong fortifications erected by Herod. S. was captured and burned during the Jewish revolt in A.D. 66, but later it was rebuilt, and c. A.D. 180-230, it enjoyed a period of prosperity. According to Christian tradition S., or rather Sebaste, was the place where John the Baptist was buried, and two Christian shrines were dedicated to him. In later times there arose a small Arab vil. *Sebastiye*. Excavations were carried out at S. in 1908-10 by Harvard Univ. under the leadership of G. A. Reisner, C. S. Fisher, and D. G. Lyon, and, in 1931-35, by a joint expedition of Harvard Univ., the Heb. Univ. in Jerusalem, the Palestine Exploration Fund, and the Brit. School of Archaeology in Jerusalem. Nearly eighty inscribed ostraca (early eighth century B.C.) and numerous decorated ivories (ninth century B.C.) were found at S. See G. A. Reisner, C. S. Fisher, and D. G. Lyon, *Harvard Excavations at Samaria 1908-1910*, 2 vols, 1921; J. W. Crowfoot, K. M. Kenyon, and E. L. Sukenik, *The Buildings at Samaria*, 1943; and J. W. and G. M. Crowfoot, *Early Ivories from Samaria*, 1938.

Samaritan Pentateuch, recension of the Heb. Pentateuch in use among the Samaritans. Of all the Heb. biblical books, only the Pentateuch, (i.e. the five books of

Moses-Genesis, Exodus, Leviticus, etc.) are recognised by the Samaritans. There are references to the S. P. in certain of the anct. church writers (Origen, Jerome, etc.) and also in the Talmud, but it was unknown in the W. until the early seventeenth century, when the traveller Pietro della Valle brought a copy from Damascus. It differs from the Heb. in orthography (being written in the Samaritan alphabet, a descendant of the Early Heb. writing, see under ALPHABET) and in a multitude of details, but only few of these are important. The codex of the S. P., which is preserved in the Samaritan synagogue at Nablus, is considered by the Samaritans as the original Pentateuch of Moses, although it has been assigned by some scholars to the first century A.D., it is certainly not earlier than the twelfth century A.D. It has been critically ed. by A. von Gall, *Der Hebraische Pentateuch der Samaritaner* (2 vols., Hesses), 1914-1915.

Samarium, metallic chemical element, symbol Sm, atomic number 62, atomic weight 150.4, discovered in 1879 by de Boissandran. It is a member of the family of rare earth metals (q.v.). S. occurs in such minerals as monazite and gadolinite, and may be obtained in the metallic state (melting point 1350° C.) by the electrolysis of the fused chloride, SmCl₂.

Samarkand, or **Samarcand**: 1. Former prov. of Russian Central Asia, called Zarafshan or Zeravshan, and in anct. times Sogdiana. A large part of it is now included in the Uzbek S.S.R., forming a region of the republic. It is watered by the Zarafshan, only navigable by rafts, and in the N.E. by the Syr-Darya. Numerous canals have been constructed, and there are sev. lakes. In the south the chief ranges are the Hisar and the Turkestan Mts., while in the north the steppes are interrupted by the Nuratyn-tau and the Karatan. Many minerals are found, and the soil is productive. 2. City of Uzbekistan, situated in the valley of the Zarafshan, among the W. spurs of the Tian-Shan Mts. It is the anct. Maracanda. S. was formerly the cap. of the anct. empire of Timur Beg (Tamerlane), which, in the late fourteenth century, included the state of Moscow within its confines; but, as with the other feudal states of Central Asia, it was eventually devastated by nomads. Long noted for its gardens, squares, fountains, and decorated buildings, there are still some good examples of the architecture of the period in the shape of large mosques within the high mud walls which encircle the old town, pierced by twelve gateways. Along the old streets are lines of low, flat-topped houses built of sun-dried brick on a poplar frame, which are in striking contrast with the modern electric power plant, cotton ginneries and silk factories, office buildings, and theatres, and especially the new Institute of Tropical Medicine. Other activities are horticulture, tanning, dyeing, and goldsmith's work. Pop. 156,000.

Samaveda, see under VEDA AND VEDISM.

Sambalpur, tn. in Orissa prov., India, on the Mahanuddy R., 145 m. W. of Cuttack, in the dist. of the same name. In 1948 was begun the construction of the Hirakud dam. Pop. of tn. 16,000; of dist. 1,182,700.

Sambhal, municipality of the Moradabad dist., United Provs., India, 60 m. S.E. by E. of Meerut. It manufs. refined sugar. Pop. 53,000.

Sambre, riv. of France and Belgium, rises in the Fr. dept. of Aisne and flows 120 m. N.E., joining the Meuse of which it is the main trib. at Namur. On its banks are situated Landreies and Maubeuge in France; Thuin, Charleroi, and Châtelet in Hainaut, and Floreffe in Namur. It is navigable for about 90 m. It was the scene of the last great battle on the W. front, on Nov. 4, 1918.

Sam Browne, army officer's belt and strap, named after its inventor, Sir Samuel Browne (1824-1901). The Brit. Army discarded it for field service after 1939.

Sambucus, see **ELDER**.

Sambul, see **SCMBUL**.

Samhita, collection of hymns, detached verses, and sacrificial formulas of the Hindu Veda (*q.v.*).

Samian Pottery, or *Terra sigillata*, name given to a form of kitchen and table crockery in use among the Romans. It consisted of a coral-red clay with a brilliant glaze, and seems to have been noted for its brilliancy. Its use was widespread, and numerous specimens have been found from Scotland to N. Africa, and from Portugal to the Euphrates. The name Samian is derived from a statement of Pliny, who says that *rasa Samia* were the everyday table services in the first century; but there were many other centres of its production besides Samos, notably Arretium in Etruria. See H. B. Walter, *History of Ancient Pottery*, 1905, and E. Hannover, *Pottery and Porcelain* (Eng. trans., vol. 1), 1925.

Sameli, **Samyeli**, see **SIMOOM**.

Samland, dist. of the former E. Prussia, bounded N. by the Baltic and Kurisches Haff, S. by the Frisches Haff and R. Pregel. It abounds in amber. A portion of the dist. was among the last ters. still in Ger. hands when their surrender was at hand in May 1945.

Samnium, dist. of anc. Italy, adjoining Apulia, Campania, and Latium. Its inhab. were called by the Romans, *Samnites* or *Subintus*. In the fourth century B.C. their invasion of Capua led to continual wars with Rome; the first in 343 B.C., the second in 327, during which Rome suffered the disaster of the Caudine Forks. She recovered Campania, however, and having taken the chief Samnite tn., made peace in 301. War broke out again in 298, when the Samnites allied with the Gauls and Etruscans. They were beaten at Sentinum, and in 290 submitted to Rome. They fought for their independence in the Social war, 90 B.C. They joined Marius in his war against Sulla, but at the Colline gate were crushed by the latter, who ravaged and depopulated S., 82 B.C. See also **ROMAN HISTORY**.

Samoa, or **Navigators' Islands**, archipelago of volcanic is. in the Pacific, stretch-

ing from N.W. to S.E., between 168° and 173° W. and 13° 30' and 14° 30' S. In spite of hurricanes, earthquakes, moist heat, and wet season (Oct. to March), they are pleasant to live in, as Robert Louis Stevenson found, who made a home in Vailima (Upolu). The forests are luxuriant, and the vegetation rich. The natives are pure Polynesians of fine physique, and skilled in the arts of boat-building and navigation. The larger group constitutes W. Samoa, under New Zealand, and the smaller, Amer. or E. Samoa.

Western Samoa includes the is. of Upolu, Savai'i, Apollima, and Manono, together with sev. small islets. Savai'i is 48 m. long and 25 m. in breadth, with an area of 700 sq. m. It is mountainous, rising to 6000 ft. The extinct crater of Mua on Savai'i rises to over 4000 ft. Upolu, 45 m. long and 13 m. broad, with an area of 430 sq. m., rises to over 3600 ft. Upolu is the more fertile of these two is., and contains the port and cap. of Apia. The climate of W. Samoa is mild and equable, with an average temp. of 80° F. and an average rainfall of 120 in. Of the chief tropical diseases some three are prevalent, hookworm, yaws, and elephantiasis; but systematic efforts have been made to eradicate them, and the last two decades have seen a considerable improvement in the general health of the natives. A determined effort is now being made to isolate the cause of malignant jaundice. Under the mandate administration water has been piped into vills. from springs, while in other vills, where this is not possible reinforced concrete tanks have been constructed. W. Samoa is administered by New Zealand under a trusteeship agreement from the United Nations. An administrator appointed by the governor-general of New Zealand, and responsible to the minister of is. ters., is assisted by a legislative council in his control of the ter. The administrator, acting with the advice of the council, may make ordinances for the good government of the ter., subject to disallowance by the governor-general. There is a high court, with a right of appeal to the supreme court of New Zealand. In matters affecting the natives the *fautua* and *faipule* act as advisers to the administrator. The two *fautua* are nominated representatives of the two leading and, formerly, rival family lines in Samoa; while the thirty-nine *faipule*, who comprise the Fono or Native Advisory Council, are nominated as representatives of local dists. Self-government is the ultimate aim. Education, once solely in the hands of the missions, and then somewhat elementary, is now, under the mandatory administration, more advanced, involving the use of Eng. To-day Grade I. or vil. schools are conducted by the missions and under the charge of native pastors; more advanced teaching is given in Grade II. schools, the missions supplying the school buildings, while the gov. supplies the teachers, who are Samoans; in Grade III. the standard is equal to that of a completed primary course. A level of education comparable to that of Grade III. can also be attained

in the European primary school, in the resident mission colleges, where pastors are trained, and in a mission day school. There is a school at Apia for the training of teachers, and in 1938 a post-primary school was opened for secondary education suitable for Samoans who intend to reside in Samoa. The chief export is copra (in 1946 13,795 tons were exported, of a total value of £340,669). Bananas, cocoa, and rubber are the only other exports of any importance. The pop. is 71,900, including Europeans and part Europeans, 5440; native Samoans (including other is. races), 66,100; Chinese (chiefly contract labourers), 290; Melanesian or Polynesian labourers, 72.

The earliest known visit of Europeans to the is. was that of Jacob Roggeveen's Dutch expedition in its world voyage of 1721-22. In 1768 Louis de Bougainville touched at the is., and in 1787 La Perouse, who named them 'Navigators' Is., a name still retained by the Fr. The first Brit. ship to call was H.M.S. *Pandora*, in 1790. In 1830 two members of the London Missionary Society arrived and with others later played a large part in the development of the country. Capt. Bothwell of the R.N. made a commercial treaty with the native chief in 1838, and a year later Lt. Wilkes, commanding an Amer. exploring expedition, made a similar treaty. In 1847 Britain appointed a consular agent, in 1853 the U.S.A., a commercial agent, and in 1861 Germany appointed a representative, and these three representatives controlled the destinies of the Samoans. Trouble arose frequently among the natives over rival claims to the native chieftainship, with internecine wars, and in 1869 the three foreign authorities undertook measures to ensure peace. At a conference in Berlin in 1889 the three controlling powers signed an Act declaring the is. neutral and independent, and providing for equal rights of their own nationals. But this arrangement did not ensure peace, and in 1898 there was more trouble over the chieftainship following the death of King Malletoa, with the result that the kingship was abolished on the recommendation of a commission. Under the Anglo-Ger. Agreement of Dec. 1899 Britain renounced to Germany all rights over W. Samoa, and similarly in favour of the U.S.A. all rights over Tutuila and other is. of E. Samoa. The civil administration of Germany did not function without native dissatisfaction, and there was a revolt in 1909. In 1914 a New Zealand expeditionary force took possession of W. Samoa, landing unopposed at Apia on Aug. 29, and remained in occupation until the setting up of civil government under the aegis of New Zealand in May 1920. The formal grant of the mandate was made by the League of Nations in Dec. 1920. In accordance with its terms and that of the United Nations trusteeship agreement, the aim of the administration has been to improve the standard of living and the social conditions of the natives; hence the encouragement of self-government, and the improvement of health and education.

For some years there were difficulties with a strong native organisation known as the Mau; but with its disappearance the administration is functioning with complete normality and goodwill. See R. M. Watson, *History of Samoa*, 1919; New Zealand External Affairs Dept., *Handbook of Western Samoa*, 1925; Sylvia Masterman, *The Origins of International Rivalry in Samoa, 1815-1934*, 1934; F. Keesing, *Modern Samoa*, 1934, and *The South Seas in the Modern World*, 1942; and New Zealand Institute of International Affairs, *Western Samoa, Mandate or German Colony?*, 1937; also R. L. Stevenson, *A Footnote to History*, 1892, and *Vailima Letters*, 1895; and R. Gibbings, *Over the Reefs*, 1918.

American Samoa consists of the is. of Tutuila, 70 m. from Apia, with an area of 40 sq. m. and pop. 10,500 (including the is. of Aunu'u); Ta'u, with an area of 14 sq. m. and the islets of the Manu'a group, area 4 sq. m., with pop. nearly 3000; Swain's Is. annexed in 1925, is about 1½ to 2 m. in diameter. Total area 78 sq. m., total pop. (1948) 17,500. The harbour of Pago Pago, which indents the S. coast like a fjord, is the only good harbour in Samoa; it is an Amer. naval station. The commandant is governor, and appoints officers and makes ordinances, but native customs, which are not inconsistent with Amer. laws, are only changed with the consent of the people. The is. are organised in three political divs., corresponding to the old Samoan political units, and in each div. there is a native governor, co. chiefs, and vil. chiefs. Judicial power is vested in vil. courts and in a high court. Nearly all the land is owned by natives, and there are no public lands. The soil is fertile, and taro, bread-fruit, yams, coco-nuts, pineapples, orange, lime, banana, mangoes, and alligator pears are grown. Copra is abundant. The chief exports are copra, reed mats, and curios. The gov. maintains forty-seven (1947) public schools, giving children over seven the opportunity of an elementary Eng. education, and there are sev. private schools under missionary auspices. The whole pop. for health purposes is under the care of the medical dept. of the Amer. Navy. Some 15 m. of public roads have been constructed. There is an Amer. naval high-powered radio station on Tutuila. The fast mail steamers of the Matson Company touch here on their regular trips between the U.S.A., Hawaii, Fiji, and Australasia. See annual reports of the governor of Amer. Samoa; general report of the governor of Amer. Samoa, 1927; and other official reports; also G. Turner, *Samoa a Hundred Years Ago*, 1881, and W. B. Churchward, *My Consulate in Samoa*, 1887, and *Nineteen Years in Polynesia*, 1910.

Samolus, genus of perennial plants (family Primulaceae). *S. rulerandi*, brookweed, the only Brit. species, has blunt fleshy leaves and clusters of small white fls.

Samos, prefecture of Greece, in the Aegean Sea, separated from Asia Minor by the Mycale Channel. Length about 27 m.; greatest breadth 14 m.; area 180 sq. m. It is traversed by a mt. range, the

highest peak of which is Kerkis (4725 ft.). The chief exports are wine, olive oil, leather, tobacco, and raisins. S. was formerly an independent principality, paying an ann. tribute to Turkey, but passed to Greece after the war of Gk. Independence. S. played an important part in anet. Gk. hist. It had extensive commerce overseas, and founded numerous colonies on the shores and is. of the Mediterranean. After the death of Polycrates (522 B.C.) its power declined, and it fell into the hands of Persia, but recovered its independence after the battle of Mycale (479). In 440, having seceded from the Delian league, it was besieged by Athens, and became a trib. state. In the year 84 B.C. it was formed into a Rom. prov. From Byzantine rule it passed into the hands of the Turks.

On Sept. 16, 1913, Brit. and allied forces landed on the is. of S., Leros, and Cos, and joined the lt. garrisons there. The Gers., however, soon captured Leros and Cos, whereupon the Brit. evacuated S. The landing was diversionary and accomplished its purpose of drawing larger Ger. land, sea, and air forces away from the lt. and E. fronts on the supposition that the Allies projected a Balkan invasion.

The chief tns. are Limen Vathios (cap., pop. 9000), Tegani, Chora, and Carlovassi. Pop. 77,900.

Samosata (modern Samsat, or Someisat), tn. of Aleppo vilayet, Asiatic Turkey, on the Euphrates, cap. of the anct. dist. of Commagene. It has a ruined castle, aqueduct, and walls, and was the bp. of Lucian and of Paul, bishop of Antioch. A Hittite outpost, it fell to Assyria in 708 B.C., and to Rome in A.D. 72.

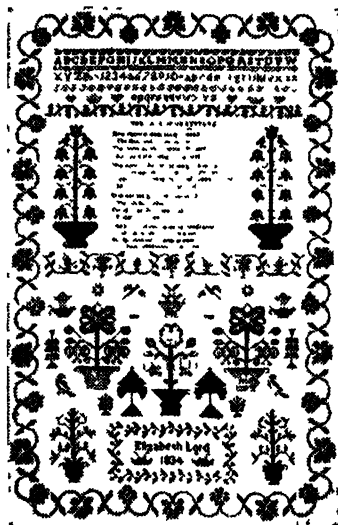
Samothece, or **Samothraki**, Gk. is in the Egean Sea, about 50 m. from the coast of Thrace. There are sponge-fishing industries and sulphur springs. Area 30 sq. m.

Samoyed, dog which takes its name from the Samoyedes (q.v.). In its native land it is used as a herd, guard, and bear-hunting animal, and it has been much employed by polar explorers. In Britain it was first exhibited in 1899. The modern S. has a snowy-white double coat; it is a powerful animal, weighing some 45 to 55 lb., with a broad skull, deep-set eyes, a body of medium length, deep chest, and broad feet. It is a hardy and alert animal, though its coat needs considerable attention.

Samoyedes, now called **Nenets**, name of sev. Ural-Altaic tribes, speaking a language not unlike Finnish, who dwell along the Obi and Yenisei Rts., and on the Arctic shores from the Khatanka to the Kanin Peninsula. They may be subdivided into Tavghil S., Ostiak S., and Yakas. The ravages of smallpox and rum have reduced their numbers in recent years. Nomadic by nature, they live by reindeer, which feed on the tundra mosses, and which, besides drawing their sledges, supply their food and dress.

Sampler, piece of embroidery or worsted work. Originally such work was done to fix on and retain a pattern considered to be of value; or, in some cases, a large piece of canvas or cloth upon which a

number of patterns were worked side by side. Later, S. meant merely a piece of needlework intended to exhibit the skill of a beginner, and was often framed and hung up for show. Such S. frequently included biblical texts or verses.



A SAMPLER, 1631

Samsat, see SAMOSATA.

Samso, Dan. is. off the E. coast of Jutland. The chief occupations are agriculture and fishing. Pop. 8000. See H. Bacton, *Landfalls and Færevell*, 1949.

Samson (Heb. *Shimshôn*, meaning perhaps 'sunny'), the last of the 'great judges' of pre-monarchic Israel. His story is told in the book Judges xiii.-xvi. S. does not properly belong to the ranks of the judges (although xv. 20 tells us that for twenty years he was judge of Israel). His exploits are entirely personal efforts of valour, and in no sense was he a deliverer of Israel from the hated Philistines. There is little religious interest in S.'s career; he is represented as a lifelong Nazirite, but no stress can be laid on this, for the idea accords ill with what is related of his exploits. But S. was for all that probably a historical character, and though the account of him furnishes us with legendary local hero adornments, it does give us some light on the civilisation of the Philistines, and on the social customs of the period: the narrative of the wedding festival of S. is the only instance in the O.T. of riddles at weddings (Judges xiv. 12-18).

Samson, saint and bishop, d. c. 565; b. in Glamorgan, Wales, a disciple of St. Illtyd, and later monk and abbot of Cadey Is. monastery. After a visit to Ireland he lived in Cornwall, being consecrated bishop. About 525 he went to

Brittany, and from headquarters at Dol spent the remainder of his life spreading Christianity throughout the region, where, as in Wales, his name is still held in veneration.

Samsun (anc. *Amissus*), seaport of the vilayet of S., Asiatic Turkey, on the Black Sea, 80 m. S.E. of Sinope; it exports cereals, copper, and tobacco. Pop. (vilayet) 409,500; (tn.) 38,100.

Samuel (Heb. *Shemul* (perhaps 'name of God')) the last judge and the first prophet of Israel, played the main part in the estab. of the kingdom of anc. Israel. His story is told in the first book that bears his name: 1. Sam. i.-vii deals with S., viii.-xv. with S. and Saul, xvi.-xxxi. with Saul and David. All that we can reckon on as hist. in the stories of S.'s birth and call, is the fact that from his early years he had a definite connection with the sanctuary at Shiloh. S. lived in the second half of the eleventh century B.C. Very soon after Saul's accession to the throne (c. 1020 B.C.), S. and he began to drift apart. The Bible ascribes to S. the honour of the movement which at last freed Israel from the Philistine yoke, but modern scholars consider Saul as a greater king than the Bible would have us believe.

Samuel, Sir H. Hart Louis, first Viscount, of Mount Carmel and Toxteth (b. 1870), Eng. Liberal statesman, b. Nov. 6 in Liverpool, of Jewish parentage. He was educated at Univ. College School, London, and Balliol College, Oxford. Contesting S. Oxfordshire, 1895 and 1900, in 1902 he was elected for the Cleveland div. of N. Riding of Yorkshire, which seat he held till 1918. Parl. secretary for the Home Dept., 1905-9, he was made privy councillor in 1908, and in that year made a name by his conduct of the Children's Bill through the Commons. Entering the Cabinet as chancellor of the duchy of Lancaster, 1909, he became postmaster-general, 1910, and president of the Local Gov. Board, 1914. In 1915-16 he held, together, the offices of postmaster-general and chancellor of the duchy. From Jan. till Dec. 1916 he was home secretary, and went out with Asquith. Losing his seat at the general election of 1918, he was absent from Parliament for nine and a half years. He held the offices of Brit. special commissioner to Belgium, 1919, high commissioner, Palestine, 1920-23, chairman of the Royal Commission on the Coal Industry, 1925, chairman of the Liberal party organisation, 1927-29. He was created G.B.E. in 1920 and G.C.H. in 1926. In 1929 he re-entered Parliament as member for the Darwen div. of Lancashire. Leader of the Liberal parl. party, 1931-35, he joined the National Gov., Aug. 1931, as home secretary, being re-elected for Darwen in the election of Oct. 1931 (until 1932). He became president of the Brit. Institute of Philosophy in 1931, and was Herbert Spencer lecturer at Oxford Univ., 1941, and leader of the Liberal party in the House of Lords from 1944. His pubs. include *Liberalism, its Principles and Proposals* (1902); *The War and Liberty* (1917); *Philosophy and the Ordinary Man* (1932); *The Tree of Good*

and Evil (1933); *Practical Ethics* (1935); *Belief and Action* (1937); *An Unknown Land* (1942); and *Creative Man* (1949). His *Memoirs* (1945) are valuable as the authoritative story of the decline of the old-time Liberal party.

Samuel, Books of, formed in the original Heb. canon one book called S. The div. does not appear before the time of the Septuagint, where we find S. and Kings enumerated as 1, 2, 3, 4. 'Books of the Kingdoms.' From the Septuagint the partition passed into the *Vulgate*, and later in the other trans. The div. of the Heb. S. into two books appears for the first time in a Heb. Ms. of 1448 and in Daniel Bromberg's ed., Venice, 1517. The title was probably selected on account of S.'s close connection with the institution of the monarchy. The two books, indeed, centre on the monarchy and fall naturally into four divs.: (1) 1. i. xv., the hist. of S. and the estab. of the monarchy; (2) 1. xvi.-II. viii, Saul's reign and his relations with David; (3) II. ix.-xx., the period of David's rule; and (4) II. xxi.-xxiv., various additional notes. See S. H. Driver, *Notes on the Hebrew Text and the Topography of the Books of Samuel* (2nd ed.), 1913.

Samural, former Jap. military caste. The term, once used for all who bore arms, became restricted to the gentry class, as distinct from the nobles (*daimio*). The Jap. feudal system was ended in 1871, the S. being prohibited from the wearing of swords. The name was changed to *shizoku* (gentry) seven years later.

Sana, riv. of Poland, rising in the Beskid Mts., and flowing into the Vistula, 4 m. N.E. of Sandomierz. Length 280 m. In the First World War the S. came into prominence owing to its N. flow and the fact that Przemyśl is situated on its banks. In Sept. 1914 the Russians swept over this area in their advance on Tarnów (see further under RUSSIA-SSAN). In the Second World War there was heavy fighting in the course of the summer offensive of 1941, when Marshal Zhukov estab. a strong bridgehead near Baranov and Sandomierz (or Sandomir), from which position the Russians launched their great final offensive in Jan. 1945.

Sa'na, or **Sanaa**, cap. of the Yemen, Arabia, is a walled tn. with eight gates, and stands at an altitude of 7,250 ft. It has a good but very dry climate, and its environs are well cultivated and watered by wells of good water. The chief article of trade is coffee; gum arabic, indigo, aloes, cereals, dates, cotton, etc., are also produced. The chief industries are leather-working, embroidery in gold and silver, working in gold, and the manuf. of arms. The treaty of S. between the Yemen and the United Kingdom and India was signed, Feb. 11, 1934, and recognised the independence of the *imam* of the Yemen, and confirmed the boundary of 1902-4 as the boundary between the Aden protectorate and the kingdom of Yemen. Pop. about 40,000. See Freya Stark, *East is West*, 1945.

Sana'i, otherwise Ab'l Majd Majdud ben Adam (d. c. 1150), Persian poet of the

eleventh and twelfth centuries, first of the three great mystical *mathnawi* (or complete-poem) writers. In early life he was attached to the court of Bahramshah. His extant work consists of seven *mathnawis* and a *diwan*. His most notable *mathnawi* is *Garden of Truth*, in about 11,000 verses, dedicated to Bahramshah, sultan of Ghazna. It reminded Edward Granville Browne (author of *Literary History of Persia*) of Martin Tupper. The other six are *Path of Verification*; *Book of the Stranger*; *Pilgrimage of Servants to the Hereafter*; *Book of Deeds*; *Book of Love*; *Book of Reason*. The *diwan* contains over 12,000 couplets, in which S. shows to better advantage.

San Andres, see CHALCHICOMULA.

San Antonio: 1. City and co. seat of Bexar co., Texas, U.S.A., stands on the San Antonio R., 80 m. S.S.W. of Austin; it is a cattle and agric. produce market, and has manufs. of flour, beer, iron and machine products, bricks and cement. The chief buildings are the Federal building, the anct. cathedral of San Fernando, and the Alamo, an old mission structure, now a museum, which in 1836 was stormed by Mexican troops, the entire garrison of 183 being massacred. Permanently settled in 1718, S. A. became a city in 1809, and developed very rapidly when, in 1919, it was found to be the centre of a rich oil-field. It is an army area headquarters. Pop. 254,000. 2. Tn. of Chile, 40 m. by sea S. of Valparaiso and 70 m. by rail from Santiago. It is the nearest port to the cap. It also has rail connection with the Central valley. It is a popular holiday resort for Santiago residents. Pop. 28,000.

San Antonio de los Baños, com. in Cuba, prov. of La Habana, 16 m. S.W. of Havana; it is a popular summer resort, and has mineral springs and baths. Pop. 13,000.

Sanatorium (from the Lat. *sanare*, to cure), estab. for certain special forms of medical treatment, or for the general treatment of convalescent patients. The majority of the sanatoria in this country are for the open-air treatment of tuberculosis, and much progress has been made in equipment. Sanatoria for the treatment of tuberculosis are estab. in mountainous dists., by the seaside, in pine forests, or in the desert. The particular climate required by each patient should be considered if good results are to be obtained. Thus in early cases, where the physique is good, mt. air is especially beneficial, whilst cases of tuberculous laryngitis do well in the desert. In later cases, where there is little hope of a cure, warm sheltered seaside places are suitable. Under the National Health Insurance Act of 1948 all persons notified as suffering from tuberculosis are entitled to apply for S. treatment. Experiments are being conducted with a view to protecting workers in sanatoria by injections of 'B.C.G.' (*Bacillus Calmette-Guérin*), an attenuated strain of the tuberculous bacterium. Advanced cases of tuberculosis are usually treated in special wards of infectious diseases and general hospitals. Loss

advanced cases are treated in sanatoria in colonies. Non-pulmonary cases, usually children, are treated in orthopaedic hospitals and special sanatoria.

San Bernardino: 1. Vil. in the canton Grisons, Switzerland, 14 m. N.W. of Chivanna, has mineral springs. The summit of the pass of S. B., which has a hospice, and leads from Chur to Bellinzona (altitude 6770 ft.), is 4 m. to the N. 2. City and co. seat of S. B. co., California, U.S.A., 55 m. N.E. of Los Angeles, in a great fruit-growing dist. There are foundries, machine-shops, railway workshops, and lumber mills. A company of Mormons founded S. B. in 1851. 3. Tn. of Paraguay, and the chief pleasure resort of the republic. The Ypacaray Lake is strikingly beautiful. Areguá, on the opposite side, is also a pleasure resort. Pop. 40,000.

San Carlos de Ancud, seaport and cap. of Chiloe prov., Chile, 575 m. S. of Valparaiso. There is a fine harbour, formerly used by Antarctic whale fishers. Pop. 3000.

San Carlos de Bariloche, tn. of Argentina, on the S. shore of Lago Nahuel Huapi (q.v.). It is a tn. of picturesque wooden chalets perched above the lake, and the streets are steep. To the S. are the heights of the Cerro Colorado and the Ventana, 7000 ft. high. Pop. 3500.

San Cataldo, tn. in the prov. of, and 5 m. W. of the tn. of Caltanissetta, Sicily, has sulphur mines near. Pop. 18,000.

San Cristobal: 1. Or Ciudad de Las Casas, tn. in the state of Chiapas (of which it was the cap. until 1892), Mexico, 480 m. E.S.E. of Mexico city. It manufs. textiles, has a cathedral, and was the residence of the famous Bishop Las Casas. Pop. 20,000. 2. Tn. in the republic and 16 m. W. of the city of Santo Domingo, Haiti; has gold, silver, copper, and mercury mines. Pop. 15,000. 3. Tn. in Los Andes, Venezuela, cap. of Tachira, 240 m. N.N.E. of Bogota; there is cattle-raising and trade in coffee. Pop. 32,000.

San Cristóbal de la Habana, see HAVANA.

Sancroft, William (1617-93), noted Eng. prelate and non-juror, archbishop of Canterbury from 1677. After the restoration of Charles II., he became dean of York in 1663 and of St. Paul's in 1664, superintending its rebuilding after the fire. S. drew up the petition against reading the Declaration of Indulgence (1687), for which he and six other bishops were committed to the Tower (1688), but later acquitted. On refusing to take the oath of allegiance to William and Mary (1689), he was suspended and superseded by Tillotson. His works include *Par paradistinus* (1651); *Modern Politics* (1652); *Three Sermons* (1654); and *Letters to Mr. North* (1657). See also by G. D'Ovly, 1866; also T. Lathbury, *History of the Non-Jurors*, 1815, and Agnes Strickland, *Lives of the Seven Bishops*, 1866.

Sancti Spiritus, city in the prov. of Santa Clara, Cuba, 48 m. S.E. of Santa Clara and 240 m. by rail or road from Havana. It trades in cattle, sugar, and tobacco. Pop. 105,000.

Sanction (Lat. *sanctus*, p.p. of *sancio*, to

'render sacred'), in jurisprudence a term used to denote a penalty of any kind declared against a transgression of any law, or one incurred by the infringement of a covenant. In a more specialised application it has come to denote the measures intended to enforce the fulfilment of international treaty obligations, and was much in use after the First World War to describe the penalties imposed by the treaty of Versailles (1919) or measures for enforcement of its articles, which were not to be regarded as hostile acts. S. were actually adopted in the form of the occupation of Düsseldorf and other German cities in 1921, and again of the Ruhr area (see RUHR, OCCUPATION OF) by Fr. forces in 1923 when Germany defaulted in the payment of reparations. S. were also incorporated in the covenant of the League of Nations (*q.v.*), Article 16 of which provided for economic and military S. against countries making war in defiance of the provisions of the covenant. In 1935, when Italy declared war on Abyssinia, S. were invoked under the covenant against the former as the aggressor. In that case, however, the S. were limited to an incomplete economic blockade (Italy having made it clear that an oil blockade would be construed as a hostile act) while the League states refrained from risking military S. (see ITALO-ABYSSINIAN WAR, 1935-36). The place of the discarded League covenant is now taken by the charter of the United Nations, the S. of the maintenance of international peace and security being contained in Article 1 of the charter. See UNITED NATIONS CHARTER.

Sanctuary, place, including sacred or consecrated precincts, where criminals could not be apprehended. The custom existed among the Greeks and among the Jews (see CITY OF REFUGIL). In England Whitefriars or 'Alsatia' was for a long period such a 'S.' (see Sir Walter Scott's *Fortunes of Nigel*), as was Holyrood in Scotland. In England immunity was intended for forty days, and applied to all crimes save sacrilege; the fugitive had to confess his guilt, clad in sackcloth, before the coroner, and swear to leave the kingdom. The right was abolished by law in 1621, so far as concerned felons, though debtors were able to take refuge in London and elsewhere until the end of the seventeenth century.

Sanctus, name given to the angelic anthem which occurs in the Preface of the Eucharist, from the opening Lat. word.

Sand, George (1804-76), pen-name of Armandine Lucile Aurore Dudevant, Fr. novelist, b. in Paris. Till the age of thirteen she was educated at her mother's home in Berri, and then she spent three years at a Parisian convent. In 1822 she married M. Christian Dudevant, a country squire, but no affection ever developed between the two. For nine years they endured a miserable existence, and then a separation was agreed on. Some years later it was made formal, and she abandoned her fortune and went to Paris to make her living by literature. She began by collaborating with Jules Sandeau,

under the pseudonym of Jules Sand, from which, by the change of Jules to George, was derived her famous *nom de plume*. She went to Paris and mixed there in the Bohemian society of the tn. At first she devoted herself mainly to artists and poets, especially Alfred de Musset and Chopin. For the former of those she conceived a passion which was reciprocated, and the two took together a momentous journey to Italy. There they found their tempers incompatible, and separated, though not before S. had become infatuated with an It. named Pagello. Her liaison with Chopin was begun when the composer was in the early stages of a fatal illness, and it is agreed that S., in all her amours, exhibited a strongly maternal instinct, for she devotedly nursed both Alfred de Musset and Chopin in their illnesses. On her return she became interested in political and social schemes, under the influence of Lamennais, Leroux, and later of Michel de Bourges. The revolution of 1848 brought disillusionment, and she retired to Nohant, where a period of quiet and communion with nature succeeded twenty years of storm. S.'s work falls into four main divs. according to period. Her output was enormous, and it is impossible to do more than name a few of her chief works. To the first period, reflecting her own marital experiences, belong *Valentine* (1832); *Lélie* (1833); *Jacques* (1834); *André and Léoné* (1835); and *Simon* (1836). In the second or socialist period we have *Consuelo* (1842) and its sequel *La Comtesse de Rudolstadt* (1854); *Le Meunier d'Angibault* (1845); and *Le Pêche de M. Antoine* (1847). The third, or idyllic period, at Nohant includes *La Petite Fadette* and *François de Champi* (1848); *Les Maîtres sonneurs* (1853); and *L'Homme de neige* (1859). A forerunner of this period is *La Mare au diable* (1846). Lastly, she returned to her early psychological manner with *Le Marquis de Villemer* (1861), *Mlle de la Quintinie* (1868), and *Flamaraude* (1876). There is a trans. of her *Journal intime* by M. J. Howe, 1929; of the *George Sand-Gustave Flaubert Letters* by A. L. McKenzie, 1922; and of her *Letters* by E. V. Lucas, 1930. See lives and monographs by E. M. Caro (Eng. trans.), 1888; R. Downie, 1909; M. F. Sanders, 1927; see also C. Maurras, *Les Amants de l'encre: George Sand et Musset*, 1916; L. Vincent, *George Sand et le Berry*, 1919; E. W. Schermerhorn, *The Seven Strings of the Lyre: the Life of George Sand, 1804-76*, 1928; and M. Toesca, *The other George Sand*, 1917.

Sand consists almost wholly of quartz grains. Among other minerals present, the most plentiful are the heavy minerals, zircon, rutile, and tourmaline. Green-sands owe their colour to the presence of the green silicate of iron - glauconite. S. is found chiefly on the seashore, from whence it is often blown inland, forming sandhills, links (Scotland), and dunes (France). Rivs. also deposit S. where the current is slack, and thus deposits of S. occur on alluvial flats and in the bays and estuaries of rivs. (in the latter as sandbanks, bars, etc.). There is practically no

means of distinguishing marine and riv. or lake S., the water-worn fragments all being more or less angular. The presence of shell fragments will, of course, point to a marine origin. The wind-blown sand of deserts is formed by the disintegration of the rock surfaces. The grains by long-continued mutual friction become remarkably rounded and polished, and are thus distinguishable from water-worn S. Some of the older S. deposits occur in the London basin, the Baeshot S. containing about 4 per cent of heavy minerals. S. is used for glass-making, polishing, and scouring (though pulverised quartz is now more commonly used), in the preparation of foundry moulds, as a cutting and etching agent (sand-blast), and for making mortar and cement.

Sandabar, or Sandabad. The *Mishle Sandabar* (Parables of S.) are a medieval collection of tales in Heb., much the same as the Gk. *Syntipas*, the *Philosophus* (see Boissonade's ed., 1823) and the Arabic *Romance of the Seven Viziers* (see Scott, *Tales*, 1800). A Lat. trans. was current early in the thirteenth century, and the tales were popular in many tongues in W. Europe as the *Romance of the Seven Sages*. For the derivation of the word see J. G. N. Keith-Falconer, *Ridpai's Fables* (p. 72).

Sandakan, or Elopura, cap. of Brit. N. Borneo, on the bay of S. It was burned by the Jap. in May 1945. Pop. 11,000.

Sandal, earliest and simplest form of footwear, composed of a sole fastened on to the foot by means of straps or thongs passed between the great and second toe, crossed over the instep, and fastened round the ankle. The sole is generally made of leather, but sometimes of wood or wicker-work. They were worn by the Jews as well as by the anc. Gks. and Roms. They are now regularly worn by Rom. Catholic friars, by peasants in Spain and the Balkans, and sometimes, for their hygienic qualities and coolness, by children and adults generally.

Sandal Magna, suburb of Wakefield, in the W. Riding of Yorkshire, England, 2 m. N.E. of the city, noted for the remains of its castle. Constructed about 1300, it became a stronghold of Richard, duke of York, and from it he went out to the battle of Wakefield, fought near by. There is an auct. church dedicated to St. Helen dating from the eleventh century.

Sandalwood, fragrant wood of *Santalum album*, a small evergreen tree with panicles of red flowers. The heartwood is used for carving, incense, and perfume, and when distilled yields an oil used medicinally by Hindu doctors.

Sandalwood (or Sumba) Island, Dutch E. Indies, area 4000 sq. m., situated S. of the is. of Flores. It breeds fine horses, one kind of which is held sacred. Polygamy is prevalent. There is a Dutch resident at Waingapu, which has a pop. of about 120,000.

Sandarac, gum exuded by the Arar-tree (*Calbtris quadrivalvis*), native of Barbary. It is used for making varnish; when powdered it is called 'pounce.'

Sandbach, tn., in Cheshire, England, 5 m. N.E. of Crewe. It has two seventh-

century crosses in the market-place (see SAXONS) and a grammar school estab. in 1594. The fn. manufs. silk, motor vehicles, wire, salt, and chemicals. Pop. 5900.

Sandblasting, use of sand, projected in a stream of compressed air, as an abrasive. A 'ground-glass' effect can be produced on plain glass, though acid etching is now more usual. Metal forgings and castings can be cleaned by this method, steel grit or shot often replacing sand; walls of buildings may also be cleaned.

Sand-bug, name given in the U.S.A. to a crustacean of the family Hippidae (*Hippa talpoides*), which burrows in the sand.

Sandburg, Carl (b. 1878). Amer. poet, b. at Galesburg, Illinois. The son of poor Swedish emigrants he received very few years of school education. When the Sp.-Amer. war broke out S. enlisted and saw service in Porto Rico. This experience seems to have decided him to obtain further education, and for four years he attended Lombard College in Illinois. He then worked as a reporter in Milwaukee, and acted as an organiser for the Socialist party. Later he joined the staff of the *Chicago Daily News*. In his books he has made himself peculiarly the poet of Chicago and of the cornfields in the ter. contiguous to it. He celebrates, generally in free verse, Chicago's crowds, its hustle, its noise, its comedies and tragedies. His most notable books of verse are *Chicago Poems* (1916); *Cornhuskers* (1919); *Smoke and Steel* (1920); and *Good Morning, America* (1923). He was successful also with two books of what he calls *Rootabaga Stories* (1922), stories for children. He followed this with another prose work, *Abraham Lincoln: the Prairie Years* (1926), one of the best, most human, and most comprehensive of all the lives of the civil war president. In 1934 he was appointed lecturer in Hawaii Univ., and was weekly columnist, during the Second World War, for the *Chicago Times* and syndicated newspapers. Later pub.: *Mary Lincoln: Wife and Widow* (1932); *The People: Yes* (1936); *Abraham Lincoln: the War Years* (4 vols., 1939); *Storm over the Land* (1942); and *Home Front Memo* (1943).

Sandau, Jules (1811-83), Fr. novelist, b. at Aubusson, was first a lawyer. The partner of George Sand's first intrigue, he collaborated with her in *Rose et Blanche* (1831); he also wrote many novels and plays independently. He was elected to the academy in 1858, and became librarian of the Mazarin Library and St. Cloud.

Sand-eel, see SAND-LANCE.

Sandefjord, watering-place on the W. side of Christiansfjord, Norway, having mineral springs. Pop. 4800.

Sandemanians, see under GLAS, JOHN.

'San Demetrio', Brit. oil tanker, when sailing in the famous *Jervis Bay* (q.v.) convoy on Nov. 5, 1940, was shelled by a Ger. pocket-battleship and set on fire. After two days in an open boat sixteen of her crew reboarded the burning tanker, managed to put out the fires, and without compass, map, or chart accomplished the almost impossible feat of bringing her safely to the Clyde.

Sanderling, or *Calidris arenaria*, belongs to the family Charadriidae, and is of very wide distribution; in the summer it migrates to Britain. From its reddish-black plumage it is often known as the ruddy plover, and, from its habit of frequenting coasts, the surf-snipe.

Sanders, or **Sander**, **Nicholas** (c. 1530-1581), Eng. Rom. Catholic controversialist and historian. He delivered the oration before Cardinal Pole's visitors at Oxford (1557), was ordained priest at Rome (c. 1559), and was present at the Council of Trêves (1561). S. settled at Louvain (1565), undertaking various missions from there. His *De Visibili Monarchia Ecclesiae* (1571) roused much opposition among the Protestants of England.

Sandflea, see CHIGOE.

Sand-fly fever, phlebotomus fever, or three-days' fever, prevalent in Mediterranean regions and in India, is transmitted by the sand-fly, *Phlebotomus papatasi*. The symptoms are sudden high fever, severe headache, and general aching. The fever usually subsides on the third day, but pain and general depression continue for some days. Circulation and respiration are accelerated, and marked nervous symptoms occur. After treatment with purgatives, either aspirin or opium is administered to relieve pain. Preventive measures lie in spraying with either aloes, eucalyptus, or formalin; screening all apertures, and having near them electric fans, as the flies enter only when the air is still. All crevices forming possible breeding places should be filled or sprayed.

Sandgate, residential dist. of Folkestone, Kent, England, 1½ m. W. of the tn. Shorncliffe camp is on the height to the N.

Sand-glass, see HOUR-GLASS.

Sand-grouse form the family Pteroclidæ in the group of charadriiform birds; they are found only in the Old World, and frequent for the most part the deserts of Asia and Arabia. The birds have compact bodies, short bills, long and pointed wings, a wedge-shaped tail, and short legs and toes. Their coloration is protective, resembling the sand on which they dwell, and their diet consists of both vegetable matter and insects. Phalar's S. (*Syrhaptes paradorus*) is an occasional visitor to Britain.

Sandhopper (*Talitrus saltator*), small segmented crustacean of the Amphipoda order, common along most sea-shores, where it burrows in the sand above high-water mark. It is closely akin to the shore-hopper, *Orchestra gammarellus*, found among rocks.

Sandhurst, par. of Berkshire, England. 4½ m. S.E. of Wokingham; 2 m. E. of the vil. Is S. Royal Military Academy for training of officer cadets. Up to 1813 the Royal Military College was at Great Marlow, but in that year was transferred to S. During the First World War the Staff College, Camberley, was also taken over for cadet training, and just over 4000 cadets were passed through the courses. The accommodation of the Royal Military College has varied many times, but in 1911 new buildings were completed to provide for

600 gentlemen cadets. Before the First World War the instruction was on a military basis, except for Eng. and a language, but later the curriculum came to include such subjects of a general educational training as hist., geography, chem., physics, political science, economics, and mechanised science. The fees were regulated to the parents' or guardians' resources, and ranged from £122 10s. to £400.

In 1946 the Royal Military Academy, S., took the place and combined the functions of the pre-war cadet colleges of the Royal Military Academy, Woolwich, and the Royal Military College, S. This amalgamation was not the outcome of the war, for it had been decided upon before the war, and as a consequence had to be postponed. It is now planned to teach the co-operation of all arms from the beginning, the study of morale and leadership in peace and war, and the cultivation of the team spirit by means of games. The academy trains candidates for the Household Cavalry, Royal Armoured Corps, Royal Artillery, Royal Engineers, Royal Corps of Signals, Foot Guards, Infantry (all branches), Royal Army Service Corps, Royal Army Ordnance Corps, and the Royal Electrical and Mechanical Engineers. The course is of eighteen months' duration, and there is a new intake of candidates each six months. There are no fees chargeable to parents, nor charges for text books, and the cadet is paid a minimum of 5s. a day (which does not include his 'star' classification as a soldier) and full board. Entry is by examination for schoolboys between 17½ and 18½, the examination being equivalent to the civil service entrance examination. Candidates from the ranks must be between 18½ and 19½, and have had at least six months' service and a standard of education equivalent to the school certificate. In both methods of entry each candidate must satisfy a regular commissions board set up by the War Office. The time of the cadet is divided on the following lines: modern studies, including such subjects as modern hist., imperial affairs, economics, Eng. writing and speaking, and modern languages, take up 18 per cent of the student's time; science, including physics and chem. and mathematics, takes up another 32 per cent, and physical fitness and hygiene not less than 4 per cent, excluding time spent on games and sport. One of the prin. aims is to create a similar spirit to that which is found in the univs. The estab. is divided into three separate colleges, each dealing with 400 cadets.

San Diego, city of California, U.S.A., and co. seat of S. D. co., 10 m. from the Mexican border. It has a large harbour, lumber trade, saw-mills, and an aircraft plant, etc., and is an important port for the U.S. Navy's Pacific fleet. There is a naval and military academy. Pop. 204,000.

Sand-launce, or **Sand-sel**, term applied to any of the eight species of *Ammodytes*, the only existing genus of Ammodytidae. They are all small, carnivorous fishes, and are found swimming near the coasts of

temperate seas of the N. hemisphere. Their bodies are covered with small scales, the air-bladder is absent, and they have long, sharply pointed snouts by means of which they bury themselves in the sand. *A. lanceolatus* is the greater sand-eel and *A. tobianus* the lesser sand-eel, both common on the coasts of Britain.

Sand Lizard (*Lucerta agilis*), lizard found on sandy heaths in Britain and central Europe, about 6 or 7 in. long; the male is green in colour, the female sandy-brown.

Sand-martin, or *Cottia riparia*, is an early summer visitor to Britain. It is a member of the swallow family, Hirundinidae.

Sandomierz, or **Sandomir**, tn. of Poland, on the l. b. of the R. Vistula, 50 m. S.W. of Lublin, near the confluence of the San R. Fruit is cultivated, and there is tanning and brewing. S. was a royal residence; in 1570 a Polish Protestant union was formed here. The Dominican church of St. Jacob was founded in 1226; the Gothic cathedral, built in the second half of the fourteenth century, has frescoes in the Byzantine style. Before 1911 S. was a border tn. of Austria and Russian Poland, and it figured in the 1914-15 battles on the R. San. It was captured, in the Second World War, by the Gers. on Sept. 8, 1939. A bridgehead was formed on the W. of the Vistula by the First Ukrainian Army in 1914, and S. carried by assault on Aug. 8; from the area the same force advanced to capture Kielce in Jan. 1945.

San Domingo, see CIUDAD TRUJILLO.

San Domingo, Battle of, took place between the Eng. and Spaniards in 1586, and ended in Sir Francis Drake's capture of the is. Another engagement took place off S. D. in 1782, when Adm. Rodney defeated the Fr. under De Grasse.

Sandow, Eugen (1867-1923), professional strong man and exponent of physical culture, b. at Königsberg, Germany. He exhibited in the Chicago World's Fair, 1893. A man of broad mind and thoughtful views, he advocated moderation in all methods of health. His system of movements, and his wonderful applications of acquired muscular power to weight-lifting, did much to create the cult of athletics all over the world, and especially in England, where he had a successful school. Many successors have sprung up in every country.

Sandoway, tn. in the S. of Arakan, Burma, in the dist. (3780 sq. m.) of the same name. It has some coasting trade. Pop. (dist.) 139,800; (tn.) 5500.

Sandown, seaside resort of the Isle of Wight, England, 6½ m. S. of Ryde, on the S.E. coast of the is. It is noted for excellent sea-bathing, and holds the 'sunshine record' for the Brit. Isles. Pop. 7600.

Sandown Park, fashionable racecourse of Surrey, England, near Esher station, occupying the site of a hospital founded in Henry II.'s reign.

Sandpiper, name for various members of the snipe family (Scolopacidae), characterised by long slender bill compressed and grooved at the tip. The common S.

(*Totanus hypoleucis*), a summer migrant frequenting tidal rivers from April to Sept., has a rapid and easy flight, and is a skilful swimmer and diver, feeding on worms and small insects. Its nest is usually made in a bank or tuft of grasses, though sometimes the pretty yellowish-white eggs are laid on the ground. The bird is about 7 in. long, the head and back are greenish-brown with irregular markings on the plumage. The under-parts are white. The wings have an expanse of about 14 in., and the tail is short. The green S. (*T. ochropus*) is a larger bird, and at a short distance appears to be black and white in colour. Its cry is extremely shrill. Other species are the wood S. (*T. glareola*), an occasional visitor to Britain, and the redshank (*T. calidris*), a handsome, graceful bird, the best-known Brit. member of its genus, often associating in large flocks on the coast in winter.

Sandra (*Luciopera luciopera*), species of pike-perch, common in the rivers and lakes of Europe, W. Asia, and also found in N. America. It may reach as much as 4 ft. in length.

Sandringham, par. of Norfolk, England, 7½ m. N.E. of King's Lynn. King Edward VII., when Prince of Wales, bought in 1862 an estate here of 7000 ac., which has ever since been a favourite country seat of the royal family. See Mrs. C. Rachel Jones, *Sandringham, Past and Present*, 1883.

Sandrocottus, see CHANDRAGUPTA.

Sandstone, rock composed of grains of sand cemented together. The sand is mainly quartz, but may include mica and felspar. S. varies from grey to reddish-brown in colour, according to the cementing substance, glauconitic, clay, calcite, iron oxide, etc., and usually is somewhat stratified. It is used extensively as building stone and for grindstones.

Sandstone, Flexible, see ITACOLUMITE.

Sandstone, see OLD RED SANDSTONE.

Sandstorm, see SIMOON.

Sandur, Maharratta state of Madras, India, in the Bellary dist. Food grains are grown, and manganese is mined near Ramandrug. Area 158 sq. m. Pop. 15,800.

Sandusky, city and port of entry of Ohio, U.S.A., cap. of Erie co., on Lake Erie, 60 m. W. of Cleveland. There is a large fish market and a trade in ice and fruit. Lime and gypsum are worked in the neighbourhood, and wooden ware is manufactured. Other industries include motor-engines, paper, chemicals, glass, and agric. implements. Pop. 25,000.

Sandwasp, see WASP.

Sandwich, Edward Montagu, first Earl of (1625-72), joined the parl. army in 1643, and distinguished himself at Naseby and in other actions. He held high office under the Commonwealth, but, nevertheless, after the Restoration he was raised to the peerage and appointed admiral. He defeated the Dutch fleet off Lowestoft in 1665, and two years later went as ambas. to Spain to conclude peace. In 1672, when the Dutch war was renewed, he was second in command to the duke of York of the Eng. fleet. He was blown up on

his flagship in the naval action of Solebay. *See also* PEPPYS, SAMUEL.

Sandwich, John Montagu, fourth Earl of (1718-92), eldest son of Edward Richard Montagu, Viscount Hinchingbrooke, and grandson of the third earl of S. After leaving Cambridge Univ. he went on the 'grand tour' of the Continent with his tutor and pub. an account of his 'voyage round the Mediterranean,' which is generally believed to have been largely the work of the tutor. Having taken his seat in the House of Lords he soon became immersed in politics and was appointed a lord commissioner of the Admiralty, his advancement being due to the influence of the duke of Bedford. He was aide-de-camp to the duke, and through this influence also gained rapid promotion in the army for purely nominal services. At the age of thirty he was first lord of the admiralty, and a few years later a prin. secretary of state. As an administrator, however, he was a complete failure and he is remembered chiefly for his association with the notorious Medmenham Brotherhood of which Wilkes was also a member, and for subsequently taking a conspicuous part in the prosecution of Wilkes. He is the 'Jemmy Twitche' of *... Beggar's Opera*, and though Capt. Cook perpetuated his name by calling the S. Isles or Hawaii after him, the compliment was misplaced. *See* the preface by J. Cook to the *Voyage round the Mediterranean, and Life, Adventures, Intrigues and Amours of Jemmy Twitche*, 1779; also H. Walpole, *Letters of George III.*, 1771.

Sandwich, anct. mkt. tn. on the R. Stour, Kent, England, 4 m. N. of Deal, now well known as a golfing centre. In the Middle Ages it was a famous naval port and harbour, but has declined since the silting up of its harbour in the sixteenth century. Near by is Richborough Castle, the Rom. *Rutupia*; the imposing ruins of a fortress of the Saxon shore remain, but the site was occupied at the start of the Claudian invasion. The Danes sacked and damaged S. sev. times. Three fine churches, out of all proportion to the tn. to-day, attest its former importance. The immigration of Dutch and Fr. refugees, encouraged by Elizabeth, gave rise to an industry in serge, balize, and flannel. S. was a leading member of the confederacy known as the Cinque Ports. As the chief port of embarkation for France and the landing-place for continental pilgrims to Canterbury, S. played a prominent part in many of the leading events of Eng. hist. *See* M. Burrows, *The Cinque Ports*, 1888, and K. M. E. Murray, *The Constitutional History of the Cinque Ports*, 1935.

Sandwich Islands, *see* HAWAIIAN ISLANDS.

Sandwort, *see* ARENARIA.

Sandy, tn. of Bedfordshire on the Ivel, 7½ m. E. of Bedford. It is the *Saline* of the Romans, and many Rom. relics have been excavated in the neighbourhood. Phosphate of lime is worked on S. Heath. There is highly productive market-gardening, and an agric., horticult., and live-stock show is held annually in Aug. Pop. 3700.

Sandy Hook, narrow, sandy peninsula in New Jersey, U.S.A., about 6 m. long, at the entry of Lower New York Bay. It has a fine lighthouse and ordnance proving grounds. It is the scene of the America Cup races.

Sandy Point, or Punta Arenas, tn. and free port of Chile on the Magellan Strait.

Sandy River, *see* BIG SANDY RIVER.

Sandys, Edwin (c. 1516-88), Eng. archbishop, b. at Hawkshead, Lancashire. After holding various eccles. offices and the vice-chancellorship of Cambridge Univ. (1553), he was imprisoned in the Tower for supporting Lady Jane Grey's cause, and on his release fled to the Continent (1551). He returned at Elizabeth's coronation, and became bishop of Worcester (1559-70), of London (1570-76), and archbishop of York (1576-88). He was one of the translators of the Bishops' Bible (1565), and of the Bible of 1572. His second son, Sir Edwin S. (1561-1619), was founder of the colony of Virginia.

Sandys, George (1578-1644), Eng. traveller and poet, son of Edwin S. In 1610 he travelled through Europe to Egypt, and pub. *Relation of a Journey in* 1615. He also wrote *Paraphrase upon the Psalms* (1636), *Christ's Passion* (1640), etc., and took an active interest in the colonisation of America, living in Virginia from 1621 to 1631.

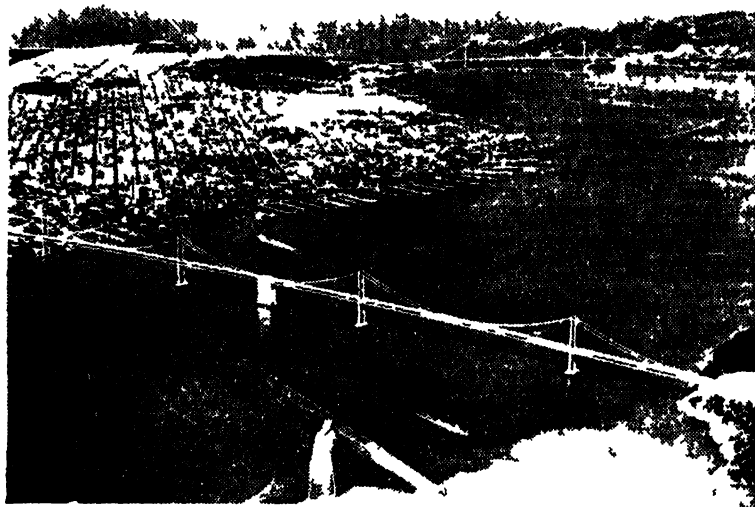
Sandys, Sir John Edwin (1844-1922), Eng. classical scholar, b. at Leicester, educated at Repton and St. John's College, Cambridge, where he had a distinguished career, winning the higher classical awards in the univ. His scholarship was recognised by honorary doctorates conferred by the univs. of Dublin (1892), Edinburgh (1909), Athens (1912), and Oxford (1920). A great humanist, S. devoted himself mainly to Gk. oratory and poetry. He brought out a number of eds. and trans. of classical authors, but his prin. work was the *History of Classical Scholarship* (1900-1908). S. was knighted in 1911. *See* life by N. G. L. Hammond, 1933.

San Felipe: 1. Tn. of Chile, cap. of Aconcagua prov., 80 m. N.W. of Valparaiso. It stands over 2000 ft. above sea level and is connected by rail via Las Vegas junction, with Valparaiso, Santiago (78 m.), and Los Andes (9 m.), for the Argentine. The tn. is an agric. and gold- and copper-mining centre. Pop. 20,000. 2. Tn. of Venezuela, cap. of Yaracuy State, 30 m. E. of the railway at Aroa. It is the chief tn. in the Turbio valley. It is accessible by rail from Tucacas by the Bolivian Railway. Its chief products are coffee, cacao, sugar, cotton, rice, copper, maize, and fruits. Pop. 10,000.

San Fernando: 1. Tn. in Spain, prov. of Cadiz, on the is. of Leon. It is surrounded by marshes from which salt is manufactured. There are also tanneries, flour mills, iron foundries, etc. N. or by are the site of the temple of the Iyrian Hercules, a Rom. bridge, and an observatory. Pop. 36,000. 2. Cap. of the prov. of La Union, in Luzon, Philippines, on the gulf of Lingayen. Pop. (1939) 23,366. 3. Tn. of Luzon, Philippines, 4 m. N.E. of

Bacolor, with large sugar mills Pop 14,000 4 Tn of Cebu Philippines Pop 18,000. 5 Cap of the prov of Colchagua, Chile, 70 m S W of Santiago Pop 29,000 6 Tn of Venezuela, on the Apure R, near the mouth of Portuguesa R. It is visited regularly by steamers from Ciudad Bolivar, and is a port of call for steamers plying on the Orinoco and Apure Rs. It trades in alligator skins. Pop 8000 7 Cap of the state of Apure, Venezuela, on the R Apure Pop 10 000
San Francisco 1 Important seaport of California and chief commercial city of the

tn, forming an impressive background. In 1906 the city was almost entirely destroyed by an earthquake, succeeded by a fire which lasted for three days, causing the loss of 1,000 lives. Within three years the city was rebuilt, the wooden structures being replaced by steel brick and reinforced concrete. The city hall, the Hall of Justice, the Custom House, the Merchant Exchange, the banks and some of the newspaper offices are among the finest buildings. Market Street is the great business thoroughfare, and Union Square a favourite shopping centre.



United States Information Service American Embassy

SAN FRANCISCO AND SAN FRANCISCO BAY

The Bay Bridge in the foreground is eight miles in length and connects San Francisco with the city of Oakland. In the background is the Golden Gate Bridge with its long suspension span.

Pacific coast. S F is in the co of the same name and has combined co and city gov. It is situated at the end of a peninsula, with the bay of S F on one side and the Pacific Ocean on the other. In 37° 47' 22" N, and 122° 2' 40" W. Its position is unrivalled, the bay which receives California's two great rivers, the Sacramento and San Joaquin has over 300 m. of shore line and extends over an area of 450 sq m. There are numerous is., some fortified, others containing buildings, such as the U S prison on Alcatraz. The entrance to the harbour lies through a strait known as the Golden Gate, and is strongly fortified. S F is an army area headquarters. The city is built on a series of hills, and a line of hills, including Telegraph Hill, Nob Hill, and the Pacific Heights, crosses the peninsula behind the

Golden Gate Park with its beautifully laid out pleasure grounds also contains Strawberry Hill (426 ft) and the gov presidio or military reservation forms another park. There is a fine public library which contains some 100 000 vols., in spite of the loss it sustained by the fire and includes the collection left to the city by Adolph Sutro. The Californian Academy of Sciences and School of Mechanics were both founded by James Lick, and a college of the state is also in the city for both instruction and research work. There are also many other educational institutions including St Ignatius Univ and a medical school. There are numerous suburbs, and means of communication are excellent.

S F Bay is the largest harbour on the Pacific coast of the U S A. As one of the

chief commercial ports of California, S. F. has an important export trade and an important domestic commerce as well, lumber, grain and flour, fruits, fish, tea, and coffee being the prin. commodities. Its position ensures its place as an important harbour, and the completion of the Panama Canal has yet further improved its position. The prin. industries are sugar and molasses refining, printing and publishing, slaughtering and meat packing, shipbuilding, machinery, clothing, canning, leather, paints; and of recent years large automobile factories have grown up. The development of the oil-fields has greatly facilitated the manufs. There is a branch of the U.S. mint.

The sunny climate of the country surrounding S. F. is favourable to farming. Fruit is very largely grown, including large quantities of wine grapes, table grapes, raisin grapes, oranges and lemons, grape-fruit, apples, pears, etc. Cereals include maize, wheat, oats, barley, rice and beans, and hay forms a very valuable crop. Hops and cotton are grown, and the main vegetables are lettuce, cauliflowers and asparagus. Fishing, especially for salmon, tuna, and sardines, is an important occupation.

The city received charters in 1850, 1851, and 1856, (owing to the corrupt gov. in 1851, and again in 1856, vigilance committees were appointed, and reforms of all kinds inaugurated, and from that time onward the prosperity of the city increased. Another charter was adopted in 1900, under which authority is largely vested in the mayor. Originally a Sp. presidio or military station, the mission of S. F. de Asis on the Laguna de los Dolores was founded in 1776, and the two settlements remained until 1835, when the Yerba Buena sprang up, and this third settlement eventually developed into the present city. In 1848 the great gold boom began, and people poured into S. F. from every quarter. A wooden city sprang up, and then was gradually replaced by more permanent buildings. Few cities contain a more cosmopolitan pop.; Gers. and Irish abound. There is a ghetto, a Sp. quarter (Lat. quarter), an It. quarter, and an immense Chinese quarter known as Chinatown, which preserves an entirely oriental aspect. As a result there have been many anti-Chinese agitations at different times. The Jap. are also numerous and caused some trouble, until banished in 1942. Pop. (1940) 631,536, (1946) 827,100. See F. Riesenborg, *Golden Gate*, 1912; G. Atherton, *Golden Gate Country*, 1915; and R. O'Brien, *This is San Francisco*, 1919.

2. Port of call of Brazil in Santa Catarina state, 100 m. from Florianopolis. It is an important railway centro. There is a trade in yerba maté, rice, manioc, and timber. Pop. 15,000.

San Francisco Conference was opened by President Truman on April 25, 1945. The representatives of fifty nations met to draw up the charter of the United Nations in conformity with the joint declaration made on Jan. 12, 1942, by the original United Nations to continue to act

together after the end of the war for the organisation of peace. The fundamental controversy during the conference was between the great and lesser powers, or the 'Big Five' and the 'Little Forty-five' over the 'veto'. The smaller states and the 'middle' states, including Canada, Australia, and New Zealand, resisted the concentration of power in five permanent members of the Security Council. They objected to the extent of the 'veto' and desired wider powers for the Assembly. For the most part, however, the five great powers maintained a solid front, and they justified their predominance in the new organisation on the grounds that responsibility must rest where there was power to enforce it. The chief result of the conference was, of course, the United Nations Charter (q.v.); but besides producing an agreed charter, the delegates also drew up the statute of the International Court of Justice and arranged for a preparatory commission which would set going the machinery of the United Nations Organisation. The conference lasted nine weeks.

San Francisco Mountains, group of mts. in Arizona, U.S.A. Their origin is volcanic and the group forms a crater. They are situated on a plateau some 7000 ft. high, the greatest elevation being 12,794 ft.

Sangallo, or San Gallo, family of It. artists and architects, whose original name was Giamberti.

Giuliano Giamberti (1413-1517) was first employed in the capacity of military engineer by Lorenzo de' Medici, but he determined on pursuing architecture as his profession. His first work was the cloister of the church of Santa Maddalena de' Pazzi at Florence. He was afterwards commissioned by Lorenzo to erect a large convent (destroyed during the siege in 1530) near the gate of San Gallo, whence he obtained the name of *di San Gallo*, afterwards adopted by himself and the rest of the family. Among his numerous other works was a palace at Savona for the Cardinal della Rovere (now converted into the convent of Santa Chiara).

Antonio Sangallo (d. 1534), brother of the preceding. Visiting Rome, he ingratiated himself with Alexander VI., to whom he proposed to convert Hadrian's mausoleum into a fortress, and he altered that building into its present form, since which time it has been called the castle of St. Angelo. The duke of Valentino employed him to erect the fortress of Civita Castellana, and afterwards that of Montefiascone. He likewise erected sev. churches, among which that of the Madonna at Montepulciano is esteemed his best.

Antonio Sangallo (d. 1546), nephew to the two preceding. He became the pupil of his uncles in Rome, and he found also an instructor and protector in Bramante. Cardinal Alexander Farnese (afterwards Paul III.) employed him to rebuild his mansion in 'he Campo de' Fiori, a work which would of itself alone have established the reputation of S. Amongst other works he was responsible for a project for completing St. Peter's, of which, on the death

of Peruzzi, in 1536, S. became the sole architect. After his death his design was abandoned altogether, not a trace of it being visible in the present structure.

See G. Klausse, *Les Sanyallo*, 1900-2.

Sangarius (now called the **Sakaria**), riv. of Asia Minor, which has a N. and N.W. course, flowing through Galatia and Phrygia, and entering the Black Sea near Bithynia.

Sanger, George (1825-1911), Eng. showman, known as 'Lord' George Sanger, b. at Newbury, Berkshire, son of a showman who had fought at Trafalgar. He began as a conjuror with his brother John, with whom he leased the agric. hall, and later, in 1871, Astley's amphitheatre. Subsequently he travelled over Europe with his circuses. He was murdered by an employee. See his *Seventy Years a Showman* (1921).

San German, old inland city of Porto Rico, W. Indies, 66 m. W.S.W. of San Juan. Pop. 22,500.

San Germano, called **Cassino** (q.v.).

San Gerónimo de Ica, see under **Ica**.

San Gimignano, tn. of Tuscany, Italy, in the prov. and 18 m. N.W. of the city of Siena. It has thirteen anc. towers, a cathedral, and is partly walled. In the summer of 1944 the tn. was shelled by the retreating Gers., causing some damage. Pop. 11,000. See E. G. Gardiner, *Siena and San Gimignano*, 1902.

San Giovanni, name of sev. tns. in Italy: (1) *San Giovanni val d'Arno*, in Arezzo prov. The church of S. Maria delle Grazie, rebuilt in the eighteenth century, was severely damaged in the battles of 1944, but the sixteenth-century nave was left almost intact, as also was Vasari's magnificent altar. (2) *San Giovanni d'Asso* Siena prov. One shell-hit destroyed a part of the church of San Pietro, 1944. (3) *San Giovanni Imarico*, in Frosinone prov. Its church was destroyed in the Second World War.

Sangli, state of Bombay prov., India, with an area of 930 sq. m. S., the cap., stands on the Kistna R., 130 m. S.E. of Poona. Pop. of state 293,100; of tn. 21,000.

Sangrail, see **GRAIL**, **HOLY**.

Sangre de Cristo, range of mts. in Colorado, U.S.A., with an altitude in places of over 14,000 ft. It is long and narrow, extending for about 70 m. from N.W. to S.E., and it separates the riv. basins of the Rio Grande and the Arkansas.

Sangro, riv. of Italy, in 'Chieti' prov., rising near Palena and flowing N.W. to the Adriatic at Fossacesia. It was the scene of a heavy battle between allied and Ger. forces during the Second World War. The 5th Corps of the Eighth Army attacked across the Trigno R. in Oct. 1943. They were faced by four Ger. divs.: 16th and 26th Panzer, 29th Panzer Grenadier, and 1st Parachute, grouped together as the 78th Panzer Corps. The Ger. parachute troops had been fighting continuously since July, when they had been thrown into action at Catania. The 78th Div. of the 5th Corps launched the main attack on Nov. 2-3. Meanwhile the 13th Corps had captured Isernia on Nov. 4. The Gers. pulled out along the whole 5th Corps front and by Nov. 8 the 78th Div. was overlook-

ing the S. Ger. resistance had stiffened and a strong winter line had been estab. along the line of the flooded S., constructed prior to Oct. 17, when the Gers. had succeeded in temporarily holding off the Brit. forces. Lack of resources reduced Montgomery's speed and freedom of action, and there was a shortage of infantry officers. In addition, the rainy season had commenced, making surprise tactics difficult. The bad weather hindered both armies. Rain set in on Nov. 10, and the mt. torrents caused the S. to flood both its banks. Ger. troops of the 1st Parachute Div., on the N. bank, found their positions flooded, and had to retire to higher ground. This possibly facilitated the estab. of an allied bridgehead.

Montgomery at first decided to launch a surprise attack on the coastal sector, with the 78th Div. and the 8th Indian Div., to break into the Ger. defences along the S. ridge on a narrow front, but the continued bad weather forced him to modify this in favour of an advance in short stages. By Nov. 22 five battalions had estab. a bridgehead on the N. bank of the riv. The main attack began on Nov. 28-29, preceded by a heavy artillery and air bombardment. Throughout Nov. 29 the 8th Indian Div. took part in particularly fierce fighting around Mozzagrogna, the Gers. counter-attacking strongly after the initial Indian advance. By evening the Allies had captured the vil. Tanks and infantry, having gained the ridge, turned outwards to clear it. They were stubbornly opposed, but progress was helped by air support. Montgomery dated the breaking of the winter line from this point. The 4th Armoured Brigade took Fossacesia on Nov. 30, and the 8th Indian Div. captured the ground overlooking Castel Frentano. Ger. paratroop resistance was especially bitter at Hill 1009, which was not taken until the beginning of Dec. On Dec. 1 Montgomery's forces advanced along the whole right flank, but again progress was hindered by bad weather and stiff enemy rearguard actions, and the attack lost much of its impetus. By Dec. 6 a bridge had been completed across the S. at Raglietta. Montgomery now planned to push one div. along the coast road to Ortona and another inland towards Chieti, the 78th Div. to be relieved by the 1st Canadian Div. Ger. resistance was bitter, especially in the New Zealand sector. By Dec. 10 the 1st Canadian Div. secured a bridgehead across the Moro, and reached the outskirts of Orsogna by Dec. 20; it took a week to clear the tn. The Ger. paratroops under Laun continued to fight tenaciously until they were finally withdrawn on Dec. 27, and transferred immediately to the sector Francavilla-Torre Mucchia.

After this battle Montgomery was assigned to other duties. The allied capacity to advance in the face of the most determined Ger. resistance and difficult conditions had been demonstrated. It was also clear that there could be no rapid conquest of Italy, as had been hoped. See also **ITALIAN FRONT**, **SECOND WORLD WAR CAMPAIGNS ON**, **Allied Invasion of Italy**.

Sanhedrin (from Gk. *συνηδριον*, council), called in the N.T. the 'Council,' was the supreme court of justice and legislative council among the Jews. Its origin is quite unknown, and details about its early list, and procedure are also scarce. It probably dates from the time of the exile, and in later times consisted of seventy-one members, who were presided over by the father of the tribunal, and, after the fall of Jerusalem, by another officer, the 'Prince,' whose office finally became hereditary. Its members were drawn from different classes among the people, but there was always a predominance of scribes and men famous for their learning. After the fall of Jerusalem the S. was removed to Jamnia.

San Ignacio de Agaña: 1. See AGAÑA. 2. Or El Cayo, tn. of Brit. Honduras, on the Old R., 120 m. from Belize. It is a recognised starting-point for the mt. Pine Ridge dist. There is a banana industry. Pop. 1600 (Indians and Creoles). 3. Place about 31 m. from Posadas, Argentina, notable for Guarani ruins. These are ruins of the old Jesuit missions, and include the remains of four squares, a cathedral, and a seminary. There are similar ruins at Apostoles on the line to Posadas.

San Isidro, Argentina, on the S. side of the Río de la Plata. It is a resort for golf yachting, and other sports. It has a fine grass racetrack. Pop. 25,000.

Sanitary Engineers, Institution of, only examining body of its kind, was founded in 1895, and incorporated in 1916. Its purpose is to promote the interests of sanitary engineering, and assist in all objects that tend to raise the status of this branch of science, including the nomination of delegates to professional committees and conferences or by active opposition to or amendment of Acts of Parliament when considered necessary. Examinations are held twice a year in Britain, and periodically in Australia, Brit. W. Indies, Ceylon, and S. Africa. The subjects cover a very wide range, and embrace all those which should come within the purview of the modern sanitary engineer. The institution has five dist. centres in the Brit. Isles, and has representatives in Australia, Brit. W. Indies, Ceylon, India, and S. Africa, and is affiliated, through its inner group, to the Federation of Sewage Works Associations of the U.S.A. Its council and four committees sit regularly throughout the year, and arrange for technical papers to be read, which are printed in the *yearly quarterly*, and for visits from time to time to engineering works of interest. It has a membership of well over 1000, comprised of the following grades: Honorary fellows, fellows, members, associate-members, associates, and students. The offices are at 118 Victoria Street, London, S.W.1.

Sanitary Institute, Royal see ROYAL SANITARY INSTITUTE.

Sanitation of Buildings. The first consideration is the choice of a suitable site. The subsoil should be well drained, and refuse used to make surface soil must be harmless and deposited in layers, each covered with soil and allowed sufficient

time to settle before the next is added. A jointless impermeable material laid on the surface will prevent emanations from the soil. On sloping sites the area of the building should be levelled and well trenched to divert the water from higher slopes. In Great Britain N. and E. aspects should be avoided. To prevent the exclusion of sunlight many local authorities have regulations limiting the heights of buildings according to their distances from other buildings and to the width of the road. Intervening spaces allowing air circulation should be plentiful, and public buildings such as hospitals and schools need a good open space surrounding them. To prevent dampness horizontal damp courses should be laid 6 m. above the ground level, below the wood of a hollow floor, and level with the upper surface of the concrete of solid floors. Exposed walls should have a vertical damp course made by filling a space of at least half an inch left between the outer and inner walls with a waterproof material. An external coating of waterproof substance will prevent absorption of moisture into the wall. Roofs must be impermeable, and slates and tiles are suitable only for roofs with a gradient of 30° to 45°. Flat roofs must have a gradient of at least 3 m. in 10 ft., and may be covered with sheet lead, concrete, asphalt, cement, or other impermeable material.

Building sanitation consists largely of the provision of sanitary fittings, the collection of the waste therefrom, and discharge to sewers or means of sewage treatment. The drainage from water closets, slop sinks, and urinals, alone or mixed with other drainage, is termed 'soil-sewage'; the drainage from sinks, baths, and lavatory basins is termed 'waste' or 'sullage'; the run-off from roofs and paved areas is 'surface water' or 'rainwater.' When the sewerage is on the combined system (see under SEWERAGE) all drainage is carried away by the same system of drains, and discharged to the public combined sewers. When the sewerage is on a separate system, soil-sewage and waste are combined together, and discharged into public soil sewers, and surface water is discharged to surface water sewers. The design of sanitary systems for buildings is based on the requirement that foul air from the sewers or drains shall not enter buildings. This involves the provision of water seals or traps on all inlets to the drainage system, in particular on the fittings themselves, which in turn involves the provision of anti-siphonage pipes or ventilation pipes, the main purpose of which is to prevent the siphonage, or alternatively the blowing, of water seals by suction or pressure developing in the drainage system as a result of the flows therein.

There are two recognised systems according to which the soil, waste, and ventilating pipes (the vertical pipes which carry the drainage down to ground level and the lateral connections thereto) are designed. A comparatively recent innovation adopted from America is known as the 'one-pipe system,' because soil and

waste fittings are connected to the same soil pipe. Thus, the system formerly in use and still most commonly used came to be known as the 'two-pipe system,' for in it there are separate vertical stack pipes reserved for soil-sewage and waste respectively. Soil and waste pipes are constructed of cast-iron, lead, copper, or other suitable metal pipe, and must be airtight and watertight throughout. The top ends of soil pipes are carried up, to serve as ventilators to the drainage system, to a height sufficient to prevent nuisance. Drains of premises are constructed on the combined or separate system according to the system of sewerage adopted. Separate systems of drainage are also used where private sewage disposal works are involved. Most drains are constructed of salt-glazed ware pipes supported on, or surrounded by, concrete. Cast-iron pipes are also used and, less frequently, concrete pipes. Drains for foul water must not be less than 4 in. in diameter, and seldom need to be larger, for the flows of soil-sewage from individual premises are comparatively small. Surface-water drains are calculated on the rainfall run-off from the paved roof or other impervious surfaces drained, an allowance of 1½ in. rainfall per hr. usually being sufficient for this purpose. All drains must be laid to gradients sufficient to ensure velocities which will carry away solids.

The prin. enactment controlling the S. of B. is the Public Health Act, 1936. London has its own Act, the Public Health (London) Act, 1936. Trade wastes are controlled by the Public Health (Drainage of Trade Premises) Act, 1937. Plans for S. of B. must conform with local authority bye-laws, which have been framed generally in accordance with Ministry of Health model bye-laws, Series IV. Buildings. *See also PUBLIC HEALTH; REFUSE DISPOSAL; SEWERAGE.* *See E. H. Blake, Drainage and Sanitation, 1942, and L. B. Escriott and S. F. Rich, The Work of the Sanitary Engineer, 1919.*

San Joaquin, riv. of California, U.S.A., rises in the Sierra Nevada, and flows S.W. and N.W. through the valley between the Sierra Nevada and the coast range to its junction with the Sacramento, below Stockton. Length 350 m. One of its tribs., the Merced, flows through the Yosemite valley.

San José: 1. City and co. seat of Santa Clara co., California, U.S.A., stands on the Guadalupe R., 10 m. S.S.W. of San Francisco Bay. It is a fine city and a popular watering-place, the seat of a univ., and of two Rom. Catholic colleges (Notre Dame and Santa Clara). The streets are broad, well paved, with numerous gardens and squares. Fruit grows abundantly in the neighbourhood. The industries include iron-founding, fruit-canning, and dried fruit packing, flour-milling, etc. Quick-silver, magnesite, and manganese are found, and there are important oil deposits. The city was partly wrecked by an earthquake in 1906, many fine buildings falling, resulting in the loss of many lives. Pop. 68,000. 2. Cap. of Costa Rica, is built on a fertile tableland nearly

4000 ft. above sea level, 105 m. W. of Limón (a port on the Atlantic), 5½ m. from Heredia, and 70 m. from Puntarenas. It contains a cathedral and a univ. (founded 1813). Other buildings of note are the national museum, containing rare pottery; the opera house, one of the most beautiful playhouses in the Americas; the national bank; the Banco de Costa Rica; the Raventos and Palace theatres; and the temple of music. The architecture of the city is a blend of Sp. colonial and modern Amer. There is trade in coffee, cacao, and sugar, and distilling, iron-founding, flour-milling, and brewing are carried on. La Sabana, a level area on the outskirts, contains an aerodrome, golf course, and other recreational facilities. Pop. 79,000. 3. Tn. of Guatemala, on the Pacific coast, and second port of the country. It is 75 m. by rail from the cap. The chief exports are coffee, sugar, honey, deer-skins, mahogany, cedar, hides, etc. Also favoured as a watering-place. Pop. 10,700. 4. Tn. of Uruguay in the dept. of the same name, connected by rail with Montevideo (60 m.). It has one of the largest and finest churches in Uruguay, notable for its clock. A statue to Fernando José Artigas (g.c.) commemorates the peace of April 1872. Products are grain and flour. Pop. 13,000.

San Jose de Cucuta, *see CUCUTA.*

San Juan: 1. Prov. of the Argentine Republic, bounded S. by Mendoza and W. by the Andes. Its surface is mountainous in the N. and W., with un fertile plains in the S.E. The prov. is wealthy in minerals, gold, silver, copper, iron, and coal being found. Agriculture is not very extensive, but wine is made, and there is a large vine area. The cap., of the same name (pop. 36,000), was destroyed by earthquake in 1914. Area 31,132 sq. m. Pop. 260,700. 2. Cap. of Puerto Rico, is built on a small is., which is connected with the N. coast by bridges. It is the second largest port in the Caribbean. The approach to its land-locked harbour is guarded by the old battlements of El Morro and San Cristobal, parts of which are still standing, built in 1531. The old city wall still encircles the older part of the tn., and some of the older buildings stand at the edge of cliffs with a drop of 300 ft. to the sea. La Fortaleza, the residence of the governor, San Juan Cathedral, Casa Blanca, the official residence of the commander of the Puerto Rico Dept., U.S.A., the church of St. Louis, and other buildings date back to the early sixteenth century. Ponce de Leon (g.c.), discoverer of Florida and first governor of Puerto Rico, is buried in the cathedral. S. J. is a naval station. There is a trade in coffee and sugar, but there are no industries of importance. Pop. 209,000. 3. Or **San Juan del Norte**, the chief port of Nicaragua on the Caribbean Sea. *See GREYTOWN.* 4. Tn. of Colombia, *see CIENAGA.*

San Juan Bautista: 1. City of Mexico, cap. of Tabasco state, on the Grijalva R., 30 m. from the gulf of Mexico. Bricks, tiles, soap, candles, and cigars are made. Pop. 17,000. 2. Tn. of Paraguay, cap. of Las Misiones dept. Pop. 15,000.

San Juan de la Frontera, see CHACHAPOYAS.

Sankara, or **Sankaracharya** (i.e. the *acharya*, or spiritual teacher) (A.D. 789-820), name of one of the most renowned theologians of India. Most accounts agree in making him a native of Kerala or Malabar, and a member of the caste of the Namburi Brahmins. In Malabar he is said to have divided the four original castes into seventy-two, or eighteen subdivisions each. He founded the sects of the Dasnami-Dandins. Towards the close of his life he repaired to Kashmir, and finally to Kedarnath, in the Himalayas, where he died at the age of thirty-two.

Sankey, **Ira David** (1840-1908), Amer. evangelist and hymn-writer. b. at Edinburg in Pennsylvania, was associated for twenty-nine years with D. L. Moody, another Amer. evangelist. His best-known hymns are 'The ninety and nine,' 'When the mists have rolled away,' and 'Faith is the victory.' Over 50,000,000 copies of his *Sacred Songs and Solos* (1873) were sold; and he also pub. *Gospel Hymns* (1875-95), *Unworn Songs for Sunday Schools* (1890), and *Young People's Songs of Praise* (1902). His autobiography was pub. in 1907.

Sankey, **John**, 2nd son of **Sankey** of Moreton (1866-1918), Eng. judge, son of Thomas S. of Moreton-in-Marsh, Gloucestershire. Educated at Lancing College and Jesus College, Oxford, of which he became a fellow, for a time he was a master at St. Paul's Preparatory School. Called to the Bar at the Middle Temple, in 1892, he became K.C. in 1909, and built up a large practice in workmen's compensation cases. Chancellor of the diocese of Llandaff, 1910-14, he was knighted in 1914. A Judge of the king's bench div., 1914-28, he was lord justice of appeal, 1928-29, and chairman of the Aliens Advisory Committee, 1915, being created G.B.E. in 1917. In 1919 S. was appointed chairman of the commission set up to inquire into and make a report on the coal situation. S. recommended state ownership and state management of the mines. Legislative effect was not given to his views, and it seemed to many that he had offended his old friends and political associates to no purpose. But his bold expression of opinion won him the friendship of the Labour party, and on the return of that party to office in 1929 S. succeeded Lord Hailsham as lord chancellor and he continued in office in the National Gov. 1931. He was chairman of the Inter-Imperial Relations Committee of the Imperial Conference and later of the Federal Structure Committee of the Indian Round Table Conference, being especially successful at the latter. He was appointed a member of the Permanent Court of Arbitration at The Hague, 1930, and was also president of the Brit. Institute of Adult Education. Through his energy a permanent committee of lawyers of repute was set to work in 1934 to review old legal doctrines which had proved increasingly embarrassing for twentieth-century judges. S. was chairman of the Standing Committee of

National Society, 1936-44. In 1936 he introduced the Bill for the abolition of trial by peers.

Sankhya, one of the six so-called orthodox systems of the Brahmins. It was founded by Kapila, according to tradition, at a very early date, but the text-books now in existence do not date back further than the fourteenth century. The oldest book now obtainable is probably *Sāṅkhya-Aṅgikā*, by Īśvarakrishna, which gives a complete sketch of the system, while the treatise of Viśṇu Bhikṣu, a sixteenth-century writer, entitled *Sāṅkhya-sāra*, in verse and prose, is a useful compendium of S. doctrines.

Sankt Pölten, tn. of Lower Austria, 31 m. W. of Vienna, with manufs. of iron implements and arms. Cotton-spinning is an important industry. S. P. has been a bishopric since 1785. Pop. 36,200.

San Lucar de Barrameda, seaport tn. in the prov. of Cadiz, Spain, on the Guadalquivir, 18 m. N. of Cadiz. It is noted as a bathing resort, and exports sherry, manzanilla, and other wines. An ancient city, probably of Phoenician origin, it developed as a centre for Amer. trade after 1492. Columbus began his third voyage (1498) here, and Macellan sailed hence, in his voyage round the world, in 1519. Pop. 29,000.

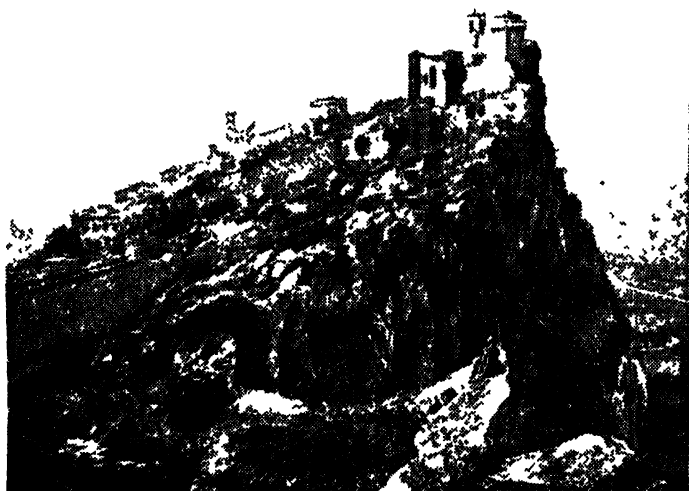
San Luis: 1. Central prov. of the Argentine Republic to the E. of Mendoza. The greater part is a fertile plain, the only range of mts. being the Sierra de San Luis (7000 ft.) in the N. Most of the prov. is devoted to pasture, and cattle and sheep are reared. The chief crops are wheat, maize, and alfalfa. Fruit is also grown to a considerable extent. It is a rich mining dist., gold, silver, iron, graphite, copper, lead, and manganese being found. Area 29,700 sq. m. Pop. 167,600. 2. Cap. of the above prov., on a plateau of the Sierra de San Luis, some 155 m. E.S.E. of Mendoza. It is the centre of the fruit-growing dist. Cattle-rearing, grain-growing, and viticulture are the local industries. An onyx quarry is being worked. S. L. was founded in 1697 by Martín de Loyola. Pop. 39,400. 3. Tn. in Cuba in the valley of the Cauto. Pop. 8000. 4. Two tns. in the Philippine Is., one in Pampanga on the is. of Luzon and the other in Batangas on the same is., on Balayan Bay.

San Luis Potosí: 1. Inland state of Mexico, lying mainly within the Central Mexican plateau. The soil is fertile and produces cereals, rice, sugar, and pepper; salt is mined and other mineral resources include silver, gold, copper, bismuth, and zinc. Area 24,415 sq. m. Pop. 679,000. 2. City of Mexico, cap. of the above state, 215 m. N.W. of Mexico city. It is important as the centre of a rich agric. and silver-mining dist., and for that reason is an important railroad centre. It is also an industrial city, with refining plants and smelters, tanneries, textile mills, flour mills, breweries, railway shops. It is a bishopric and has a univ. Pop. 97,800.

San Marcos: 1. Dept. in the W. of Guatemala, partly bounded by the Pacific Ocean. The chief products are wheat,

maize, coffee, sugar, and cacao. San Marcos, the centre of the coffee industry, 8000 ft. above the sea level, is the cap. The motor road from Quetzaltenango (35 m.) is exceptionally picturesque; it is a section of the Pan-Amér. highway and is continued to the International Bridge over the Suchiate R. at Talisman into Mexico. Pop. (including dist.) 16,000. 2. Tn. of Texas, U.S.A., co. seat of Hays co., on the San Marcos R. It has boiling springs which afford good water power for the cotton mills and other manufacturing, and there are large cattle-raising estates in the vicinity. Pop. 6000.

on a mt. about 2500 ft. high, 17 m. N.W. of Urbino. Its streets are very steep and narrow, and from a distance the houses look as if they were built one on top of another. There is only one road up the mt. leading to the tn., which is otherwise inaccessible. An electric railway from Rimini to S. M. was completed in 1932. In the Second World War Brit. forces of Gen. Alexander's command entered the republic, after stiff fighting against the Gers., on Sept. 19, 1944, its neutrality already having been violated by the enemy. See W. Ricci, *La Repubblica di San Marino*, 1904; Giannini,



D. McLeish

THE CAPITAL OF SAN MARINO ON MONTE TITANO

San Marino, small independent republic, embraced in the area of Italy between the provs. of Forlì and Pesaro e Urbino. It has a frontier line of 24 m. and an area of 38 sq. m., its pop. being 12,100. It is governed by a council of sixty members (in 1950 a Communist-dominated coalition), two of whom act as regents for a term of six months. It sustains a military force of all able-bodied men, excluding teachers and students, between the ages of sixteen and fifty-five. Cattle-raising and agriculture are the chief industries. Wine, cattle, and stone are the prin. exports. It is one of the oldest states in Europe, its independence dating from the thirteenth century. The republic is under the protection of Italy, sev. treaties of friendship having been ratified, the last being revised in 1914. Fascist rule was overthrown in 1943, and the old democracy restored. Its cap., a tn. of the same name, is seated

Historical Records of the Republic of San Marino, 1911; and H. Luke, *In the Margin of History*, 1933.

San Martin, José (1778-1850), S. Amer. soldier, the liberator of Peru and Chile, b. at La Plata. He took part in the estab. of the Argentine Republic, and was made a general of the Argentine Army in 1816. S. M. invaded Chile with an Argentine force, and brought about the deliverance of Chile from the Sp. dominion, after a war which extended over three years. He was offered the dictatorship of the new state by the Congress of Lima, but he declined it. S. M. pursued his anti-Sp. campaign in Peru, whence he succeeded in driving out the Spaniards in 1821. He was made a president of a governing council of five members. In the following year he resigned his office and returned to Chile. Soon after this he left S. America for Europe, and spent the

last twenty-five years of his life in Paris. See R. Rojas, *San Martin, Knight of the Andes*, 1945.

San Martin, dept. of Peru, with Loreto to the E., Huanuco to the S., Libertad to the S.W. and W., Amazonas to the N.W., and Lima to the N. The R. Huallaga traverses the dept. from S. to N. Cap. Moyobamba. Area 17,448 sq. m. Pop. 94,800.

San Mauro Pascoli, small tn. in Forlì, Italy. In the Second World War the Palazzo Municipale and Casa Pascoli, the bp. of the poet Giovanni Pascoli and now kept as a museum, were both badly damaged in the fighting of 1944. Pop. 3800.

San Michele, small is. near Venice, famous for its church and as a resort for literary men.

Sanmichele, Michele (1484-1559), It. architect, b. at Verona. In 1500 he went to Rome and worked under Bramante. He was employed with Antonio Sangallo in repairing the fortifications in central Italy, where he first introduced the use of bastions. He built many beautiful gates and palaces in Venice and Verona.

San Miguel: 1. Dept. of S.E. Salvador, having its shores washed by the Pacific Ocean. Gold and silver are mined by modern methods and coffee is grown. There are many medicinal springs. Pop. 80,000. 2. Cap. of the above dept. and the scene of large fairs. It produces coffee, henequen, cattle, and cereals. It is the seat of a bishopric. Pop. 14,800.

San Miguel de la Palma, see PALMA.

San Miguel de Mayumo, pueblo, prov. of Bulacan, Luzon Is., Philippines, 30 m. N. of Bulacan. Gold, iron, and petroleum are found here. Pop. 30,000.

San Miniato, tn. in the prov. of Pisa, Italy, 23 m. S.W. of the city of Florence. The tn. sustained considerable damage in the battles of 1944. The tenth-century cathedral was mined by the Gers. as an act of reprisal against the people, who had been ordered to gather in the building as a refuge during the battle. The façade was unharmed but the roof was damaged. The church of St. Francis suffered more serious damage, the Palazzo Grifoni was half destroyed, and the medieval tower, the Rocca, blown up. Pop. 21,600.

San Nicolas de los Arroyos, riv. port in the prov. of Buenos Aires, Argentina, on the R. Parana, 150 m. N.W. of Buenos Aires. Beef-preserving and flour-milling are carried on. Pop. 42,000.

San Pablo, tn. in the prov. of Laguna, Luzon Is., Philippines, 17 m. S.S.W. of Santa Cruz. Pop. 30,000.

San Pedro, tn. of Paraguay, 90 m. N.E. of Asuncion. It is a riv. port and cap. of a dept. of the same name, in which tobacco, rice, and sugar are grown, and cattle reared. The tn. exports Paraguayan tea. Pop. 15,000.

San Pedro Sula, tn. in the dept. of Santa Barbara, Honduras, 30 m. W. of Puerto Cortés, and 120 m. N.W. of Tegucigalpa by rail and road. It is situated in the large and fertile Sula valley and trades in sugar and bananas. The Mayan ruins of Traversia are 8 m. distant. Pop. 20,400.

San Piero a Grado, small tn. in the prov. of Pisa, Italy. Involved in the battles of 1944, its unique Romanesque Basilica of the eleventh to twelfth centuries was damaged by the demolition of the campanile by the Gers.

Sanpo, or **Tsan-Pu**, see BRAHMAPUTRA. **Sanquhar**, royal burgh of Dumfriesshire, Scotland, on the R. Nith, 24 m. N.W. of Dumfries. S. has been a burgh since before 1484, and a royal burgh since 1598. It is an agric. centre, and has manufs. of small textile goods. Pop. 2000.

San Rafael: 1. Cap. of Marin co., California, U.S.A., 15 m. N. of San Francisco. It is a resort for invalids, and has manufs. of gloves; farming is carried on. There are two military academies. Pop. 8000. 2. T. of Argentina in the prov. of Mendoza about 100 m. S. of Mendoza. It is a thriving agric. and live-stock dist. and ranks as the second tn. in the prov., with an urb. pop. of 20,000 and a surrounding pop. of 80,000.

San Remo, city in the prov. of Imperia, in N. Italy, on the gulf of Genoa, 26 m. E.N.E. of Nice. S. R. produces olives, lemons, oranges, and molasses. Its mild climate makes it a favourite resort for sufferers from lung diseases. In the battles of 1945 the modern city suffered severely, but the old tn. survived almost intact. The cathedral sustained only slight damage. Pop. (com.) (1939) 30,000.

San Remo Conference, see EUROPE (HISTORY), *San Remo Conference*.

San Roque, city in the prov. of Cadiz, Spain, 7 m. N.W. of Gibraltar. It was built by the Spaniards in 1704 after the loss of Gibraltar. Pop. 11,500.

San Salvador: 1. Tn. and cap. of the republic of El Salvador, central America. It is on the R. Asaguate, 30 m. inland from the Pacific, in the valley of Las Hamacas, and on the slope of the volcano S. S. at a height of 2115 ft. It was founded by Don Jorge de Alvarado in 1528, and has been the cap. since 1834. In 1854 and 1873 it was almost destroyed by earthquakes. The city, repaved and drained throughout, is modern, and built in a style of architecture adapted to earthquake risks. There are fine gov. buildings and houses, handsome parks, and a modern concrete stadium. The archbishop of El Salvador has his seat here. Near by is the interesting church of Panchimalco. The chief manufs. are candles, ice, silk scarves, shawls, cotton cloth, indigo, coffee, and cigars. The city is 23 m. from the port of La Libertad, to which runs a modern asphalt motor road, completed in 1926. Pop. 102,300. 2. Name given by Columbus to the first is. he discovered in the New World. The original Indian name was Guanahani. The modern name is Watling's Is. Though it has never been finally settled whether this was indeed Columbus's first landfall, most authorities agree that it was, and the is.'s Bahamian legislature in 1926 officially accorded the honour to it. Pop. 670. 3. ... São Salvador. Name given by the Portuguese to Bonza Congo, the chief tn. of the 'kingdom of Congo,' in

Angola, on the W. coast of Africa. It is 160 m. inland in 6° 15' S., 1840 ft. above sea level. There are the ruins of a sixteenth-century city, a fort dating from 1850, and good gov. offices. Pop. 3000.

San Salvador (Cuba), see BAYAMO.

Sansculottes (i.e. 'without breeches'), name given in scorn, at the beginning of the Fr. Revolution, by the court party to the democratic *proletaires* of Paris. The latter accepted this supertone reproach with sardonic pride, and the term soon became the distinctive appellation of a 'good patriot.' Towards the close of the Convention, the name, connected as it had been with all the sanguinary excesses of the period, naturally fell into bad odour, and soon after totally disappeared, but was given fresh life by Carlyle.

San Sebastian, city and fashionable watering-place of Spain, in the prov. of Guipuzcoa, is seated at the foot of a hill crowned by a strong citadel on the bay of Biscay, 50 m. N.W. of Pamplona. It has fine bathing facilities, and is annually visited by many thousands of holiday seekers from all parts of Europe, but especially from Madrid. The tn. has been built on a regular plan since the days of the Peninsular war, when it was stormed and laid in ruins by the Brit. Among its many attractions are a casino, a bull-ring, theatres, etc. It is the see of a bishop, has a fine roadstead, and carries on a large shipping trade, but a large portion of the loading and unloading is done at a harbour 3 m. E. of the tn. Wine, fruit, textiles, matches, wool, turpentine, cork, and minerals are exported, and glass, flour, paper, soap, sail-cloth, cotton, and beer are manufactured. It was formerly the cap. of the prov. S. S. suffered severely during the Franco-Sp. wars, being taken by the Fr. in 1719, 1794, and 1808. Franco's insurgents entered the city at the end of Aug. 1936. Pop. 124,900.

San Severino, tn. in the prov. of Macerata, in the Marche, Italy, 14½ m. W.S.W. of Macerata. Pop. 17,300.

San Severo, tn. in the prov. of Foggia, Italy, 18 m. N.W. of Foggia. It is a cathedral tn. Pop. (com.) 45,800.

Sanskrit Language and Literature. Sanskrit, the literary language of anc. India, belongs to the Indo-Iranian branch (the Aryan in the strict sense) of the Indo-European (family of) languages (*q.v.*); and above all others, by the originality, purity, and abundance of its forms, it is calculated to throw light on the laws of the formation of language. It also possesses a rich literature which has furnished materials for native grammarians to work upon. The study of Sanskrit was begun in 1785, with the trans. of the philosophic poetic work *Bhagavadgītā* ('The Song of the Holy One'), pub. by C. (later Sir Charles) Wilkins, under the auspices of Wm. (later Sir Wm.) Jones, who in 1783-84 founded in Calcutta the Asiatic (later the Royal Asiatic) Society, with the aim to study all the manifestations of anc. Indian thought, and to create a centre for research in this field of study. Although already in the sixteenth century the It. traveller F. Sassetti (1540-88), and in

1768-75 the Fr. Jesuit P. Cœurdoux (his papers, however, were pub. forty years later), recognised a certain similarity between Sanskrit and the European languages, it was Jones who proved the relationship between Sanskrit and Gk. and Lat. Once commenced the spread of these studies was very rapid, being much facilitated by the previous labours of native grammarians. Connected with this pioneer work were H. T. Colebrook, A. W. and F. von Schlegel, F. Bopp, A. L. de Chézy (the first prof. of Sanskrit at the Sorbonne), F. A. Stenzler, F. Rosen, E. Burnouf, C. Lassen, J. Princep (prof. of Sanskrit at Oxford, who estab. the foundation of modern knowledge of the Indian scripts), and other scholars, mostly Eng.

The influx into India of the first tribes speaking Aryan dialects probably took place in the second half of the second millennium B.C. Parallel with the employment of the Prakrits, i.e. the vernaculars, Sanskrit, which was originally a refined form of the language of the 'Maddadesa' (the Indian homeland), developed into an artificial, literary language. Sanskrit represents the language of the Brahman civilisation, while the Prakrits, particularly the form known as Pali, became the language of Buddhist and Jain literature. Sanskrit evidently owed its development to the efforts of early grammarians, the most important of whom was Pāṇini, who lived in the fifth or fourth century B.C. In the last two thousand years or so Sanskrit underwent no substantial changes. However, it was not in common use before the second century A.D., and it was only from the time of the great king Samudragupta (A.D. 340-75) that it became almost the only inscriptional language of N. India. From the fifth century onwards it was and still is to Brahmanism what Lat. was and still is to-day to the Rom. Catholic Church, the literary language, the lingua franca of religion. Later, Sanskrit was also used by Buddhists and Jainists, and became the language of learning throughout the Indian continent. Its predominance in the cultural and scientific sphere remained unchallenged until the Islamic invasion (shortly after A.D. 1000) and conquest (twelfth century) brought a new literary language into prominence (Urdu).

Literature.—The volume and breadth of Sanskrit literature is surprising. It may be distinguished into two periods: (1) the early or Vedic Sanskrit, or more properly Aryan period, and (2) the classical or Hindu period. The sacred writings of the early period, made up in four collections, called the Veda, consist chiefly of hymns, chants, and prayers. The first collection is known as *Rig-Veda* (which is the earliest literary work couched in an Indo-European language); it contains 1028 hymns—in all, 10,600 verses. *Atharva-Veda*, a much later and more popular collection, consists of spells, charms, marriage hymns, philosophical reflections, etc. The *Sama-Veda* is a book of tunes, and the *Yajur-Veda* is a ritual manual. The main collections of the second period are the *Brahmanas* (*brāhma*, the prayer-

energy; *mana*, the hidden power pervading the universe), consisting of arid treatises, discussion among priests, analogies, symbolisms; the *Āraṇyakas*, or 'forests': elaborate rituals, deeper professional discussions, subjects of 'forest-dwelling'; the *Upanishads*, or sessions of intimate discussion, a kind of Indian philosophy: parables, dialogues, anecdotes, theorems, etc. Finally also the *Pūrāṇas*, or Vedic supplements, should be mentioned, containing explanations of the rituals, astronomy, etymology, grammar, phonetics, etc. There are two Sanskrit epic poems of great length, the *Mahābhārata* and the *Rāmāyana*. The former, 'The Great Poem,' containing 200,000 complete verses, tells of a war of succession in the old Kuru kingdom of the Delhi region; *Rāmāyana*, containing 48,000 verses, celebrates the deeds of a certain king of E. India, and of his four sons: it was perhaps composed in the second century B.C., while *Mahābhārata* in its present form may have been composed between 100 B.C. and A.D. 200. *Mahābhārata* may be considered as a kind of Brahmanic encyclopædia of Hindu life, ruled by the law of *karma*, and organised as a matter of four stages and fixed caste divs. With the anc. epics we may also class the *Purāṇas*, more popular poems about the gods; while the *Vedas* were led book to the lowest class, the boon of reading the *Purāṇas* was not denied to them. *Rāmāyana* is ascribed to Vālmīki, who is considered as the 'Founder of Poetry' (*Ādi-kavi*). Much more is known about Aśvaghoṣa (c. A.D. 100), a Brahman converted to Buddhism who brought to the service of his new faith the Brahman strict linguistic training. He was a great poet and philosopher; he tried to work out a metaphysics of the indefinite from the ante-metaphysical Buddhism of the older school. He brought a new literary power into Buddhism, but his poems, celebrated in all Buddhist lands, are also quoted in the Brahmanic anthologies. His great poems are *Sundara-Nanda* ('Nanda the Handsome'), Buddha's conversion of his reluctant half-brother Nanda, and *Buddha-charita* ('Life of Buddha'). Modern scholars consider him as an 'ancestor,' if not the progenitor, of Sanskrit drama. Mention may be made of another great Buddhist poet, Arya-Śūra (third-fourth century A.D.), the author of the beautiful *Jātaka-mālā* (*Jātaka-Garland*), thirty-four episodes out of the former reincarnations of Buddha. 'The later Buddhist Sanskrit literature of India was a welter of Tantric and Yogic mysticism, which after its expiry (eleventh to twelfth century) in the country of its origin continued its existence in Nepal and Tibet.' (F. W. Thomas.)

Modern scholars date the beginning of the classical Sanskrit literature at about A.D. 300; it is sometimes termed 'Alexandrine,' and it is distinguished by aesthetic theory, intricate metres, philosophic mysticism, studied and elaborate display of culture and technique, and long descriptions. In most cases there is only new treatment of old matter, but it would be

wrong to think that in the main the sentiment of these great Sanskrit poets was artificial. The main literary forms of the classical Sanskrit literature are (1) poetic anthologies (i.e. collections of lyric, erotic, didactic, devotional, and descriptive poetry), (2) dramas (mainly comedies or farces, and no tragedies), and (3) collections of fairy-tales and other stories. The greatest poet of all this time, and indeed of all Sanskrit literature, is Kālidāsa (fourth to fifth century A.D.). Two new epics were written by him, *Kumāra-sambhava* ('Birth of the War God') and *Raghu-vamsa* ('Story of the Raghu Lineage'). Kālidāsa's delicacy, freshness, and ripeness of sentiment were already recognised by Goethe soon after Sir Wm. Jones pub. (1789) the famous masterpiece *Sakuntalā*, a play. *Megha-dūta* ('Cloud Messenger') depicts his domestic sentiment. Other epic poets were Bhāravi (*Kirātārjūṇiya*, 'Kirāta and Arjuna', sixth century A.D.); Bhāṭi (*Rāvaṇa-vaho*, 'Slaying of Rāvaṇa', the Sinhalese king Kumārādāsa (*Jānaki-harana*, 'Rape of Janaka's Daughter', sixth century); the greatest master of Sanskrit, Bāna (*Harsha-charita*, 'Life of Harsha', and *Kadāmbari*, seventh century); Māgha (*Śāṅgāli-vadha*, eighth century); Bhavabhūti, a great dramatist and a master of Sanskrit (eighth century), and a few others. The greatness of these poets obscures much minor literature which has dropped out of existence. Fables and fairy-tales are indigenous to India. Here mention may be made of the most famous collections: the early *Pañcatantra*, known in Eng. as 'The Fables of Pīpaly', and its tenth-century recast, *Hitopadeśa*, or 'Book of Useful Counsels'; *Śuka-sapha* ('Seventy Tales of a Parrot'); *Viśālā-pancha-vimśatikā* ('Twenty-five Stories of a Vampire'); and others. In the Middle Ages many of these found their way into Europe, and appear as medieval legends, e.g. *The Book of the Seven Wise Masters*. Some of the best of the tales of the *Thousand and One Nights* also come from this source. Later Sanskrit work of importance came with the introduction of the romance, first made popular by Dandin (*Dasa-kumāra-charita*, 'Story of the Ten Princes', c. A.D. 700). Other great writers of romances were Subandhu (*Vāsavadatta*, sixth century A.D.) and Bāna (see above).

In the opinion of the natives the Indian drama had its origin in very anc. times, its invention being ascribed to the gods. All the heroes and heroines of the plays (there are hundreds of surviving plays) resemble one another, and the species rather than the individual is represented. There are also standing characters, such as the *rita* who is the *gracioso* of the Sp. stage, and the *vidūṣhaka*, the practical but clownish attendant on the hero. The classical age of the Indian drama divides into three periods. Of the drama before Kālidāsa, only one piece remains, the *Mṛichchhakatika* ('Toy Cart'), ascribed to King Śūrasaka. To Kālidāsa himself are ascribed three plays. The third period begins with Bhavabhūti (eighth century).

The Sanskrit literature also contains works dealing with hist., philosophy, grammar, astronomy, algebra, jurisprudence, and medicine. The most important of these works are *Rājatarangini*. ('River of Kings,' Kāhāna's chronicle of Kashmir, twelfth century), *Kathā-sarīt-sāgara* ('Ocean of the Rivers of Stories,' by Somadeva of Kashmir, eleventh century), *Māna-sūtra* (a book of architecture), *Bṛhat-saṃhitā* (an astronomical work of Varāha-mihira, sixth century), *Amara-kośa* (dictionary of Amara, seventh century). The scientific literature divides itself between the *Dharmaśāstra* (civil and religious law); the *Arthaśāstra* (the science of philosophy, politics, and practical life), and the *Kamaśāstra* (the science of love). The *Sūtras* were books of rules. The characteristic of Sanskrit scientific literature is the schematic and subdivisive method of setting forth subject-matter.

See A. A. Macdonell, *Sanskrit Literature*, 1909; *Vedic Grammar*, 1910, and *India's Past*, 1927; F. Edgerton, *The Panchatantra Reconstructed* (2 vols.), 1924, and *Sanskrit Historical Phonology*, 1946; A. B. Keith, *The Sanskrit Drama*, 1926, *Classical Sanskrit Literature*, 1927, and *History of Sanskrit Literature*, 1928; M. Winternitz, *History of Indian Literature*, 1927-34; L. Renou, *Grammaire sanskrite*, 1930; V. Pissani, *Grammatica dell' antico indiano*, 1930-33; J. Manson, *Esquisse d'une histoire de la langue sanskrite*, 1931; F. Max Müller, *India*, etc. (new ed.), 1931; K. F. Leidecker, *Sanskrit*, 1934; E. D. Perry, *A Sanskrit Primer* (4th ed.), 1936; B. Ghosh, *Linguistic Introduction to Sanskrit*, 1937; G. T. Garrat, *The Legacy of India*, 1937; V. P. Bokil and N. R. Parasnis, *New Approach to Sanskrit*, 1942; G. B. Shastri, *Introduction to Classical Sanskrit*, 1943; W. Whitney, *Roots, Verb-forms, etc., of the Sanskrit Language*, 1943; S. N. Dasgupta, *A History of Sanskrit Literature* (vol. I.), 1947; J. Gonda, *Remarks on Sinites in Sanskrit Literature*, 1949; and C. Kephart, *Sanskrit*, 1949.

Sansovino, Andrea (1460-1529), whose real name was Contucci, was an It. sculptor and architect, the son of a peasant; he early showed artistic ability, and studied at Florence under Pollaiuolo. Before he was thirty Florence was indebted to him for the 'Blessed Chapel of the Holy Spirit' and the noble group called the 'Baptism of Jesus Christ.' He went to Portugal, where he designed many buildings, including a royal palace. In 1499 he returned to Rome, where he executed in the church of St. Augustine his wonderful 'Madonna and St. Anne,' and other statues and bas-reliefs. He died on his estate at Monte-Sansovino. S. gave much attention to the theoretical side of his art, and combined the gifts of constructive ability with power to put his conceptions into practice. See study by G. H. Huntley, 1935.

Sansovino, Jacopo Tatti (1479-1570), It. sculptor and artist, b. at Florence. He exchanged his surname for that of his master, Andrea Contucci da Monte Sansovino. S. produced his 'Bacchus' at Florence, and a number of structures at

Venice, among which are the Palazzo Cornaro a San Maurizio (one of his best works), San Francesco della Vigna, the Mint, public library, etc.

Sans-Souci, royal palace near Potsdam, Germany, with handsome grounds. It was erected by Frederick the Great (1745-1747), of whom it contains many relics, and was the scene of the Potsdam conference (q.v.).

San Stefano: 1. Popular holiday resort in Turkey, on the sea of Marmora, about 7 m. W.S.W. of Istanbul. The preliminaries of the treaty of peace between Russia and Turkey and the powers were signed here in 1878, afterwards modified by the treaty of Berlin. 2. Tn. on the N. coast of Sicily. The Axis defences in the Second World War, extending from here for 80 m. to Catania, were the last and strongest before the enemy once more fell back and lost Messina and the whole of Sicily (July 28-Aug. 17, 1943).

Santa Ana: 1. Cap. of dept. S. A., El Salvador, 40 m. N.W. of the city of San Salvador, with which it is connected by rail as well as with Acajutla. It has manufs. of cigars, pottery, starch, spirits, sugar, and textiles. The dist. produces coffee and sugar, and zinc, copper, iron and silver are found. Pop. 84,300. 2. City and co. seat of Orange co., California, U.S.A., 34 m. S.E. of Los Angeles. It produces celery, oranges, lemons, walnuts, petroleum, and barley, and manufs. sugar, glass, and farm machinery. Fisheries are commercially important. Pop. 31,000. **Santa Ana de Cuenca**, Ecuador, see CUENCA.

Santa Anna do Livramento, tn. of Brazil in the state of Rio Grande do Sul, on the Uruguayan border. It is reached from Porto Alegre (360 m.) by a branch line of the Uruguayana railway. It trades in cattle, pigs, dried meat, and fruit. Pop. 28,000.

Santa Barbara: 1. Tn. of Honduras, Central America, 65 m. from Puerto Cortés, for which it is the commercial depot. It manufs. sombreros and spirits. Pop. 5000. 2. Tn. on the S.E. of the Is. of Panay, Philippine Is.; it has industries of cattle-raising and the cultivation of sugarcane, Indian corn, rice, cocoa, coco-nut palm, and tobacco. Pop. 20,000. 3. City and co. seat of Santa Barbara co. in S. California, U.S.A. It has commercial fisheries, is in a remarkably fertile region, and has important interests in stock-raising and fruit-growing. Pop. 34,900.

Santa Catharina, maritime state of Brazil, bounded on the E. by the Atlantic and on the S. by the Rio Grande do Sul. It includes the fortified Is. of the same name, and sev. smaller ones on the coast. The soil is fertile, Indian corn, beans, onions, fruit, and manioc being the prin. products, while indigo and cochineal plants grow spontaneously, and wheat and flax give good returns. A prominent industry is the gathering and preparation of 'maté' or Paraguayan tea, which is an article of export. The state is well wooded, yielding excellent timber. Coal deposits of commercial value exist, and gold, silver, and petroleum are to be

found. The cap. is Florianopolis, also called Deesterro and S. C. In this state and adjacent places Ger. settlements, embodying 4000 sq. m. of land, were estab. long before the Second World War; 20 per cent of the pop. of the settlements were of Ger. origin, and the Ger. language was spoken everywhere. But the Ger.-speaking people in Brazil were not Ger. subjects, and evidently had no wish to become part of any Ger. empire. Area 20,800. Pop. 1,267,400.

Santa Clara: 1. Prov. of central Cuba, with an area of 8300 sq. m. It has an undulating surface, with rich agric. lands, and the production of sugar is the chief industry. Tobacco, coffee, and fruits are also obtained, as well as wax and honey. Cattle-raising, too, is an important industry, and the prov. is rich in minerals. S. C. suffered much from cyclones in Oct. 1910. Pop. 871,000. 2. Cap. of the above prov., 155 m. E.S.E. of Havana by rail or road. It is the second largest inland city of Cuba, and the centre of a fertile agric. region. It is linked by rail with its port, Cienfuegos, 40 m. distant. The tn. is attractively situated 360 ft. above sea level, and girdled by hills of coral rock. The railway to Trinidad goes through the finest scenery in Cuba. Pop. 122,200.

Santa Clara. *see* ABRAHAM-A-SANTA-CLARA.

Santa Claus, *see* NICHOLAS, SAINT.

Santa Cruz: 1. Tn. on the E. coast of Tenerife Is., cap. of the Canary Is., and of the prov. of the same name, estab. 1927. It is an important coaling port, and is connected by marine cable with Europe, W. Africa, and S. America. The chief exports are tomatoes, bananas, potatoes, wine, brandy, and cochineal. An air service between S. C. and Las Palmas was estab. in 1931. Area of prov., 1329 sq. m. Pop. 428,000. Pop. of tn. 104,700. 2. Or St. Croix, largest of the Virgin Is. of the U.S.A., in the W. Indies, with an area of 84 sq. m. Together with the other Virgin Is. it was purchased from Denmark in 1916. A range of hills runs parallel with the coast at the W. end, the highest peak being Blue Mt. Earthquakes and hurricanes are frequent. Sugar cultivation used to be the chief industry, but operations were suspended in 1930 owing to the fall in world sugar prices. Cattle-breeding is carried on and tropical fruits of many kinds grow in abundance. The chief tns. are Christiansted (pop. 4400), known colloquially as 'Bassin,' on the N. shore, and Frederiksted (pop. 3500) or W. End, on the W. side, commercially the more important place. The Is. was discovered by Columbus on his second voyage. Pop. 21,000. 3. City and co. seat of S. C. co., California, U.S.A., on the bay of Monterey. It is a popular seaside resort, and is noted for its fish. Pop. 16,800. 4. Chief tn. and cap. of the prov. of La Laguna, Luzon, Philippine Is., on Laguna de Bay at the mouth of S. C. R. It is noted for its manuf. of palm wine or brandy. Pop. 20,000. 5. Tn. of the Argentine Republic in the government and on the R. Santa Cruz. Gold and petroleum are found.

Sheep farming is carried on extensively in the valley. Pop. 7000. 6. Seaport and chief tn. of the Is. of Palma, in the Sp. group of the Canaries, situated in the middle of the E. coast. Pop. 10,000. 7. Ter. of Argentina, lying between the Atlantic and the Andes, and including a part of Tierra del Fuego. There are sev. rivs. flowing into the Atlantic, and a number of large lakes in the W. The ter. is named after the riv., navigable for 160 m. Sheep-rearing is carried on, and there are wild horses on the desolate plateaus. Cap. Gallegos. Area 93,952 sq. m. Pop. 24,500. 8. Dept. of Bolivia, in the E., with Brazil to the E. and Chuquisaca to the N. Mostly a level plain, there is much swamp and forest; the soil is well watered and fertile, but the climate is not healthy. Products include coffee, cocoa, sugar, rice, maize, cotton, indigo, and fruits. Dye-woods and rubber are procured. Gold, silver, iron, petroleum, and quicksilver are found. Cap. Santa Cruz de la Sierra. Area 144,941 sq. m. Pop. 393,000.

Santa Cruz de la Sierra, cap. of dept. of S. C., Bolivia, 275 m. E. of Cochabamba. It is situated in a fertile dist. devoted to sugar-cane and stock-raising, and has flour mills, sugar mills, tanneries, and distilleries. The tn. was founded in the sixteenth century, and with improved communications will become more important. For some years it has had to rely on air services with San José and Cochabamba, but two railways are being constructed, one to Yacuba on the Argentine border, and another from Corumbá, Brazil. The tn. is 2 m. from the R. Piray, and is built mostly of timber and plaster in the Sp. colonial style. Pop. 30,000.

Santa Cruz Island, in the Pacific Ocean, *see* under LORD HOWE ISLAND.

Santa Elena, tn. of Ecuador, 67 m. from Guayaquil. The gov. salt works are in the vicinity. Petroleum is found in the St. Elena peninsula; there is a refinery.

Santa Fé: 1. Central prov. of Argentina, with an area of 50,916 sq. m. The soil produces wheat, corn, linseed, and other crops in abundance, and there are vast numbers of cattle on extensive farms. It is one of the wool-producing provs. Area 52,056 sq. m. Pop. 1,700,000. 2. City, cap. of the above prov., near the junction of the Salado with the Paraná. It is 250 m. N.W. of Buenos Aires, but nearly 300 m. by rail. It is connected by rail with the chief tns. of Argentina, and is a port of call for small riv. steamers. The S. F. railway has its headquarters here. Hides and timber form the chief articles of trade. Shipbuilding is also carried on. It is a univ. tn., and has one of the five appeal courts of the republic. Pop. 154,000. 3. Cap. of New Mexico, U.S.A., 11 m. E. of the Rio Grande, is a popular health resort. It is a shipping centre for Mexican and Indian curios, and for pinyon nuts, and there are manufs. of hand-made jewellery and Mexican and Indian blankets and rugs. The cathedral is the oldest in the U.S.A., and S. F. one of the oldest cities. Pop. 20,000.

Santa Fé de Bogotá, see **BOGOTÁ**.

Santa Irena, see **SANTAREM**.

Santalaceae, natural family of trees, shrubs, and plants of wide distribution. *Thesium humifusum*, bastard toad flax, is the only Brit. species. Sandalwood trees (*S.*) are an important branch.

Santa Maria (Da Bocca do Monte), tn. of Brazil, the railway terminus for Puerto Alegre, from which it is distant about 150 m. It is the commercial centre of a rich dist., which produces yerba maté, timber, wine, rice, coal, fruit, Indian corn, olives, and live-stock. There are tanneries, hat factories, and breweries. Pop. 39,500.

Santa Marta: 1. Seaport of Magdalena dept., Colombia, S. America, on the E. of a bay in the Caribbean Sea, at the mouth of the Manzanares R., 110 m. N.E. of Cartagena, and 60 m. from Puerto Colombia. Coffee, cocoa, bananas, hides, and tortoiseshell are among the prin. exports. The United Fruit Company has its headquarters here. The tn. has a hist. of four centuries and close associations with Bolívar, whose home is open to inspection. Pop. 50,000. 2. **Sierra Nevada de Santa Marta**, mt.-group in Magdalena, Colombia, S.E. of the tn., near the Caribbean Sea. Its greatest height is 17,400 ft.

Santa Maura, see **LEUCADIA**.

Santa Monica, city of California, U.S.A., in the co. and 14 m. S.W. of Los Angeles. It is a popular watering-place, having a fine sea beach. There is a military academy. Pop. 53,500.

Santander: 1. Prov. of Old Castile, N. Spain, bordering on the bay of Biscay, traversed by the Cantabrian Mts. There is forest and pasture land, and mining and manufs. of copper, iron, zinc, lead, and coal are also carried on. Area 2108 sq. m. Pop. 414,200. 2. Cap. of the prov. of S. (anc. *Portus Plendium*), sheltered port on the bay of Biscay, 47 m. from Bilbao. Behind the city are the mts. known as Picos de Europa (Peaks of Europe), the highest (9000 ft.) being Torre de Cerredo. The older part of the city is situated on a hill crowned by a castle and has narrow tortuous streets. There is a thirteenth-century cathedral, in the Gothic style, with a noteworthy crypt. The newer part has wide straight streets lined with trees and flanked by handsome buildings and imposing residences. On the far side of the promontory, a mile to the W., is Sardinero, a favourite seaside resort. Students from many foreign countries attend the summer univ. of S. S. is a regular port of call for steamers from Liverpool to the W. coast of S. America. Tobacco, cigars, and paper are manufactured. Wine, flour, iron, zinc ore, and foodstuffs are exported. A wireless station was estab. soon after the First World War. Nineteen m. from S. at Santillana del Mar are the famous caves of Altamira (*q.v.*). In the Sp. civil war Franco's forces entered it on Aug. 25, 1936, its fall leading two months later to the surrender of the Gtton and Asturian defences. Pop. 114,300. 3. Dept. of Colombia, on the N.E. frontier. Silver, gold, and emeralds are found. Coffee, cacao, and tobacco are grown. Area

12,379 sq. m. Pop. 118,500. Cap. Bucaramanga. 4. Or Río de Jiménez, riv. of Mexico, in state of Tamaulipas, is formed by sev. streams from the E. slope of the Sierra Madre, and flows E., with a N. bend, and enters the gulf of Mexico at the Barra de S. 4. **Santander, Norte de, Colombia**, see **NORTE DE SANTANDER**.

Santarem, or Santa Irena: 1. (Rom. *Sealabis*, or *Presidium Julium*), tn. of Estremadura, Portugal, cap. of Santarem dist., on the Tagus, 46 m. N.N.E. of Lisbon. Olive-oil, vegetables, fruits, and wine are produced. The only Portuguese saline spring is near by. It has a large theological seminary. Pop. (tn.) 50,000; (prov.) 422,000. 2. Tn. of Para, Brazil, on the Tapajós, near its union with the Amazon, 60 m. from Montalgre. Rubber, sugar, tobacco, medicinal plants, and cacao are cultivated, and cattle reared. S. is a wireless telegraph station. Pop. 40,000.

Santa Rosa: 1. Cap. of Copan dept., Honduras, central America, 80 m. N. of San Salvador. Much tobacco is produced, gold and silver are mined near, and it is the centre of a rich cattle-raising dist. There is an airport. Pop. 6000. 2. Cap. of Sonoma co., California, on S. R. Creek, 50 m. N.N.W. of San Francisco, in a vine-growing dist. Fruit drying and canning is an important industry. There are shirt and shoe factories, and tanning is carried on. The earthquake of 1906 did much damage. Pop. 12,600. 3. Tn. of Argentina, cap. of La Pampa ter., and centre of a stock-raising and agric. area. Pop. 14,000. 4. Tn. of El Salvador, 14 m. from Manzanilla. There are gold and silver mines in the vicinity. Pop. 10,000.

Santa Rosa de los Andes, see **LOS ANDES**.

Santa Scala (holy stairway), or **Pilate's Staircase**, famous staircase on the N. side of St. John's Church in the Lateran Palace at Rome. Its twenty-eight marble steps are supposed to have belonged originally to Pilate's house at Jerusalem. It leads to the medieval papal chapel, and penitents ascend it on their knees.

Santa Tecla (or **Nueva San Salvador**), tn. of El Salvador, 8 m. from the cap. It is a coffee-growing and balsam producing centre. The huge crater of San Salvador volcano may be reached from the tn. Pop. 33,300.

Santayana, George (b. 1863), Sp.-born Amer. philosopher, b. in Madrid, one of the few men of Sp. blood who have made a big contribution to the philosophy and literature of the U.S.A. When he was eleven his parents moved to the U.S.A. He graduated from Harvard Univ. in 1886, specialising in philosophy. He became an instructor there, and from 1889 to 1912 was prof. of philosophy. One of his first literary productions was a book of sonnets, which appeared in 1894. In 1896 came his great contribution to the study of aesthetics, *The Sense of Beauty*. Along somewhat similar lines was his *Interpretation of Beauty and Religion* (1901). Then followed what is probably his masterpiece, *The Life of Reason* (1905-8). Pub. in five vols., it treats of reason in society, religion art, and science. There is a

certain fascination in his style, due partly to his Sp. origin and partly to the fact that this former Catholic now writes as a materialist and sceptic. Since 1912 he has spent his time writing and travelling. Other works include *Winds of Doctrine* (1913); *Character and Opinion in the U.S.* (1920); *Scepticism and Animal Faith* (1923); *Selected Poems* (1923); and *Platonism and the Spiritual Life* (1927). In 1927 he also pub. *The Realm of Essence*, first of 4 vols. on *Realms of Being*, described as being a 'contemporary application of Aristotle's thought,' and issued between 1927 and 1940. Other books are *Persons and Places: the Background of my Life* (1915); *The Realm of Matter* (1928); *The Gentle Traditions of Bay* (1931); *The Last Puritan* (a memoir in the form of a novel, 1936); *The Realm of Truth* (1937); *Egotism in German Philosophy* (new ed., 1939); and *The Realm of Spirit* (1940). See G. W. Howgate, *George Santayana*, 1939.

Santee, riv. of S. Carolina, U.S.A., formed by the Congaree and Catawba (Waterco) Rs. which unite in Richland co. (S.E.). It flows S.E. into the Atlantic near Cape Romulo. Santee Canal in Berkeley co. connects it with Cooper R.

Santags, see under JANITA HILLS.

San Thomé, see ST. THOMAS.

San't Jago. **Santiago**, largest of the Cape Verde Is. Cap. Porto Praia. Pop. 51,000.

Santiago: 1. Prov. of the republic of Chile, bounded on the N. by Aconcagua, on the S. by Colchagua, on the E. by Mendoza, and on the W. by Valparaíso and the Pacific. It covers a total area of 5557 sq. m. and forms part of the 'vale of Chile,' noted for its fine climate and fertility. Forage, vegetables, and cereals are grown, and cattle reared. Pop. 1,261,700. 2. Cap. of Chile, stands 1700 ft. above sea level on the Mapocho R., 115 m. by rail S.E. of Valparaíso, the fourth largest city of S. America. It occupies an area of 8 sq. m. and is traversed by the Mapocho R. S. is essentially a modern city, with its traffic problems and skyscrapers, buildings of ten storeys being common. Lofty office buildings stand adjacent to luxurious blocks of flats. A wide and beautiful avenue, the Avenida Bernardo O'Higgins (formerly Alameda), runs through the centre of the city for 2 m. Well laid-out public gardens and garden suburbs enhance the city's attractions. S. is an archiepiscopal see and the seat of a univ. Here are the official residence of the president of Chile, law courts, congress palaces, national library, and central market. Other buildings include the Palace of Fine Arts (1925). School of Engineering, Agronomical Institute, and the Casa Moneda, containing historic relics, paintings, and sculpture. One of the most striking approaches to S. is the Santa Lucía Hill, with ornamental gardens and splendid views over the city. There is an air service to Arica. The Pan-Am. Highway between S. and Arica (1475 m.) is usually covered in sev. stages, occupying about 50 hrs. S. was founded by the Spaniards on Feb. 12, 1541, and was finally freed from Sp.

control between 1810 and 1818. Pop. 1,002,000. 3. Tn. of Santo Domingo, W. Indies, 85 m. N.W. by N. of the tn. of Santiago Domingo. Pop. 12,200. 4. Tn. of Panama, 102 m. S.W. by W. of the city of Panama. There are gold mines in the vicinity, and it has mineral springs and baths. Pop. 5000.

Santiago de Compostela (anct. *Campus Stellæ*), city of Galicia, Spain, 33 m. S.W. of Corunna. It is an archbishop's seat, and has a univ. (founded 1532). The Romanesque cathedral (begun 1082) is built on the supposed site of the grave of Sant' Iago (St. James the Great), Spain's patron saint. Other notable buildings are the Benedictine convent of San Martín Pinario, the Hospital Real for pilgrims, and the convent and church of San Francisco. There are some manufs. of soap, chocolate, etc., but the city has declined from its medieval splendour. Pop. 28,000. See C. Gascoigne Hartley, *Santiago de Compostela* (Medieval Tn. series), 1912.

Santiago de Cuba, city of Cuba and cap. of Oriente prov., one of the finest W. Indian cities, but extremely hot. It is built on a fine harbour of the S. coast, and is connected by road and rail with Havana, 475 m. N.W. It is a picturesque tn. of irregular streets, of brightly coloured red-tiled houses, plazas, and trees. Overlooking the bay, in front of the tn. hall, on the Avenida de Loraline, is a marble pylon with a bronze bust of Adm.-Cdr. Sir Lambton Lorne (d. 1917), which was unveiled in 1922 as a tribute of gratitude to his rescue of the crew of the U.S.S. *Virginian*. It has a magnificent but land-locked harbour, 5 m. long and 2 m. broad, defended by forts. There are manufs. of iron goods and tobacco, and the chief exports are sugar, coffee, bananas, fruits, tobacco, mahogany, cedar, hides, wax, manganese, iron ore, copper, etc., all shipped mainly to the U.S.A. The city was founded in 1514 by Velasquez, and in the Sp.-Amer. war of 1898 was the scene of a great naval engagement (July 3), ending in the destruction of Cervera's fleet. S. de C. has a large cathedral, which is built in the Hispano-Amer. style, with two towers and a dome. The nave is very wide, and the side chapels are ornate with marbles and fine mahogany. Pop. 120,500.

Santiago de las Vegas, tn. of Havana prov., Cuba, 12 m. S. of Havana. Much tobacco is manufactured. Pop. 16,000.

Santiago del Estero: 1. Central prov. of the Argentine Republic, bounded N.E. and E. by Chaco ter., S.E. and E. by Santa Fé. It consists of plain and forest-land, and the marshy Salinas Grandes are in the S.W. Its chief rvs. are the Salado and the Dulce. Vines, sugar, lucerne, wheat, maize, and alfalfa are especially cultivated. Cotton and tobacco are also produced, and cattle-breeding is carried on. Area 53,151 sq. m. Pop. 574,100. 2. Cap. of above, on the Dulce, 88 m. from Tucuman. It has a national college (founded 1553) and a cathedral. The tn. has been much modernised of late years, and is visited for the Rio Hondo springs. Pop. 76,000.

Santiago de los Caballeros, tn. of, the Dominican Republic, cap. of the dept. of the same name, on the R. Yagui, 25 m. S. of Puerto Plata. There is trade in hides, tobacco, and coffee. Pop. 59,600.

Santillana, **Inigo Lopez de Mendoza**, **Marqués de (1398-1458)**, Castilian poet, statesman, and soldier, b. in Old Castile, son of Diego Hurtado de Mendoza (see **HURTADO DE MENDOZA**), whose family claimed descent from the Cid. He was created marquis of Santillana by John II. of Castile in 1445 for his services on the field of Olmedo. Besides being a gallant soldier and patriot he was a wise statesman, but after the death of John II. he devoted himself to letters. As a poet he is considered inferior only to Juan de Mena (q.v.). His song, *Vaquera de la Finjosa*, is to be found in most Sp. anthologies. He is known especially for his contributions to Sp. versification and is said to have been the first to write Sp. sonnets after the manner of Petrarch, leaving some forty sonnets notable chiefly for their smooth versification and general conventionality. His works include also lyrics and didactic poetry, particularly his *Centiloquia* (1449), a collection of 100 proverbs rendered in eight-line stanzas and written specially at the behest of John II. for the instruction of Don Enrique, the heir apparent. His Dantesque *Comedia de Ponza*, also in octave stanzas, was founded on the sea-fight off Ponza (anc. Pontiae) in 1435, when the kings of Aragon and Navarre, together with the infante of Castile, were captured by the Genoese. One of his sons was the famous Pedro, archbishop of Toledo, commonly called the 'Grand Cardinal,' who for many years was the chief minister of Ferdinand and Isabella.

Santipur, tn. in the dist. of Nadia, W. Bengal, India, 45 m. N. of Calcutta. A festival in honour of Krishna is held here, and the tn. used to be a centre of Sanskrit culture. Pop. 40,000.

Sant Jago, see **JAMAICA**.

Santo, New Hebrides, see **ESPIRITU SANTO**.

Santo Domingo: 1. Is. of the W. Indies, the oldest settlement of European origin in the New World, having been founded by Bartolommeo Colombo (Columbus) in 1496. After its discovery it was occupied by numbers of Spaniards with imported African slaves, and the local tribes were quickly exterminated. Fr. and Eng. colonists followed. After 1722 the colony of mixed Fr. and Eng., which was called Saint Dominique, flourished and continued to prosper until the Fr. Revolution, when the free coloured people demanded that the principles of the revolution should be extended to them. This was opposed by the whites and conflict ensued. In 1791 a decree gave mulattoes Fr. citizenship but was soon reversed, and mulattoes and blacks made common cause against the whites in an insurrection. In 1793 the abolition of slavery was proclaimed, and the Eng. having invaded the is., Toussaint l'Ouverture, the leader of the blacks, helped the Fr., of whose army he was made commander-in-chief. In 1798

the Fr. became masters of the is., which had been ceded to them by the treaty of Basle in 1795. Toussaint in 1801 adopted a constitutional form of government, in which he was to be president for life, but Napoleon, resolved to restore slavery and reduce the is., sent out a large force under Gen. Leclerc. Toussaint was cajoled into an armistice and treacherously sent to France, where he died in prison in 1803. The infuriated blacks resumed the struggle under Gen. Dessalines and, on the approach of an Eng. fleet, the Fr. evacuated the is. The following year independence was declared and the aboriginal name Haiti was revived. Dessalines was made life governor, but later proclaimed himself emperor. He was assassinated in 1806, and two rival chiefs, Christophe and Pétion, estab. themselves in the N. and S. of the is. while the Spaniards took the E. portion, which they named S. D. After the death of Pétion and Christophe, Gen. Boyer became master of the W. part and later invaded and captured the whole of the is. The entire is. was then called Haiti, but in 1813 Boyer was driven out by a revolution and in 1844 the people in the E. part estab. the Dominican Republic. See also **DOMINICAN REPUBLIC**; **HAITI**; **TOUSSAINT L'OUVERTURE**. 2. Alternative name of the Dominican Republic (q.v.). 3. Cap. of Haiti, see **CIUDAD TRUJILLO**.

Santonin, neutral crystalline principle, molecular formula $C_{15}H_{15}O_5$, obtained from the unexpended flower-heads of *Artemisia maritima*, variety *Stechmanniana* (B.P.), or *Artemisia pauciflora* (U.S.P.). It is used as an antelmintic, being very effective in expelling round worms. It colours the urine yellow and has a peculiar effect upon colour vision.

Santorin, see **THIRA**.

Santos, seaport, state of São Paulo, Brazil, 35 m. S.E. of the city of São Paulo. It is a handsome city, but unhealthy, though the serious mortality of comparatively recent years has within the last thirty years been eliminated as a result of the work of the Santos Dock Company in laying out the present city with modern buildings and fine avenues. The harbour ranks next to that of Rio de Janeiro in importance, and it is the greatest coffee port in the world. It also exports bananas, rubber, and hides. Santos is the great immigration port of Brazil, and has local fame as a holiday resort. There are some fine monuments, including one in the Avenida Ana Costa to commemorate the brothers Andradas, heroes of the 1822 revolution. There is also one to Bartholomeu de Gusmão, a pioneer of flying, and one to Braz Cubas, founder of the city (1544). Pop. 110,000.

Santos-Dumont, **Alberto (1873-1932)**, Brazilian aeronaut, b. at São Paulo, won the Deutsch prize of £10,000 in Paris, 1901, for the many advances he had made towards perfecting the dirigible gas balloon. In 1906 he travelled 220 metres in 21 sec. on a petrol-driven aeroplane of his own contrivance. After a series of experiments, he made a flight of 17 kilometres in 15 min. in a tiny monoplane with

a wing span of only 18 ft. and a 30-h.p. engine. In 1904 was pub. his *My Airships: a Story of My Life*.

Sanusi, see **SENUSSI**.

San Vicente, 1. Central dept. of Salvador, bounded on the S. by the Pacific Ocean. It is mountainous, and has extinct volcanoes, geysers, and hot springs. Pop. 120,000. 2. Cap. of the above dept., on the Acaluapa R., 32 m. E. of San Salvador, near the foot of a volcano of the same name, and 65 m. W.N.W. of San Miguel. It has manufs. of shawls, cloth, shoes, hats, sugar, and cigars; corn, tobacco, and coffee are grown. Its colonial church, 'El Pilar,' is notable. The tn. was damaged by an earthquake in 1937. Pop. 21,700.

São Antonio, Brazil, see under **PERNAMBUCO**.

São Carlos do Pinhal, tn. of São Paulo state, Brazil, on the Monjolinho R., 165 m. from the city of São Paulo. It has a considerable trade in regional products such as coffee, cotton, cattle, sugar, and tobacco, and its industries include distilleries, breweries, and textile mills. Pop. 17,000.

São Francisco, riv. of Brazil, rises in the Sierra da Canastra, and flows N.E. through Bahia, and is the boundary between Alagoas and Sergipe, entering the Atlantic 200 m. S.W. of Pernambuco. Total length, 1800 m. Its navigation is impeded by the Paulo Afonso Falls (265 ft.), 180 m. from its mouth. Its chief trib. is the Rio Grande.

São João de Boa Vista, tn. of Brazil, in the state of São Paulo (180 m. by the Paulista Railway from the city of São Paulo). It is 205 m. from Santos. It has a thriving commerce in coffee, cattle, rice, sugar, and cotton. Pop. 38,500.

São Lourenço, tn. of Brazil in the state of Minas Geraes. It stands 2300 ft. above sea level and is linked by rail with Rio de Janeiro and São Paulo. It is noted as a holiday centre and for its hydro estab., with natural mineral waters for the treatment of gastric and intestinal complaints. There are usually 25,000 visitors every season. In the vicinity is an aviation field. Pop. 5000.

São Luiz de Maranhão, seaport of Brazil, cap. of Maranhão state, on the W. coast of Maranhão Is. There are manufs. and exports of sugar, textiles, rubber, drugs, etc. Pop. 70,300.

Saône, riv. of France, rises in the Faucilles Mts. (Vosges) and flows S. past Gray, Châlon, and Mâcon to its confluence with the Rhone at Lyons. The chief affluents are the Doubs and Ognon. Length, 300 m., navigable for 232 m. to Corbeil. It is connected by canal with the Loire, the Seine, the Meuse, the Moselle, and the Rhine.

Saône-et-Loire, S.E. dept. of France, once part of Burgundy, bounded on the E. by the dept. of Jura and the R. Saône, and on the W. by Nièvre and the R. Loire. It is divided into five arrons.: Mâcon, Autun, Châlon, Charolles, and Louhans. The surface consists of fertile plains which yield wheat and oats, crossed by the hills of the Côte-d'Or, on whose

slopes the vine is grown. Coal is mined, and there are famous iron-works at Le Creusot. Copper and bronze are manufactured at Autun, Châlon, and Mâcon, and porcelain at Digoin. There are mineral springs at Bourbon-Lancy. Area 3330 sq. m. Pop. 566,700.

Saône, Haute-, dept. of N.E. France, formed from parts of Franche-Comté, and divided into two arrons.: Vesoul and Lure. Area 2062 sq. m. The surface is mainly a plateau gradually descending from the Vosges in the N. (highest point, Ballon de Servance, 3970 ft.) towards the S., and intersected by many valleys and depressions. Chief rivs., the Saône, with its tribs. the Coney, Lanterne, Durgeon, and Ognon, and tribs. of the Ithone and Doubs. There is much forest, and wheat, oats, rye, vegetables, and tobacco are grown. A little wine is produced. Coal, copper, manganese, and iron are mined, and there are mineral springs. Cap. Vesoul. Pop. 202,500.

São Paulo de Loanda, see **LOANDA**.
São Paulo: 1. State in Brazil, the best organised and most commercially prosperous state of the union. A mt. chain, the Serra do Mar, separates the low hot coastland from the inland plateau, where the climate is dry and moderate in temp. The soil is fertile, watered by the affluents of the Paraná, and produces coffee in large quantities, sugar, tobacco, beans, rice, cereals, fruits, cocoa, and cotton. S. P. supplies the world with half its coffee, the market being controlled by the Coffee Defence Institute, created in 1924. Coffee-planting owed its impetus, in 1885, to the realisation that the plant flourished best in the famous 'red earth' deposits. The forests then receded before axe and fire, to be replaced by the coffee shrub. Other forms of agriculture, sugar-cane, cotton, and cereals, were neglected and the mania continued for fifteen years, during which new centres of pop. arose, mostly of a most cosmopolitan kind, and the cap. became an important commercial centre. In fact the city and state of S. P. are closely united in their efforts to sustain the prosperity of the coffee industry, and it may be said that their economics, government, and literature all use and are bound up with the cultivation, sale, and shipment of coffee.

Stock-raising is an important pursuit, but has not developed to the extent of other industries. Gold, silver, iron, and coal are found. The manufs. include cotton, woollen and silk goods, jute, boots and shoes, alcohol, wine and other drinks, cigars, machinery, iron goods, glassware, hats, furniture, and chemicals. Trade is very flourishing, the expansion in commerce having been remarkably rapid. Agric. development has been retarded through lack of labour, and immigration is therefore encouraged; the pop. is thus very mixed in nationality, a large proportion being lt. There are still vast tracts of virgin forest, though wide expanses have been cleared for cultivation. The state is well served by railways, and has the best roads in the country. The rivs. are mostly useless for

navigation, but the numerous waterfalls offer great hydro electric possibilities which are only partially exploited, though there is hardly a town without electric light. Education is free, entirely secular and compulsory. The S. P. railway is a Brit.-managed line prosperous and important, forming the outlet to the wealthy resources of the state. From it a line reaches out to Corumbá in the state of Mato Grosso. The important network of railways which serves S. P. has its outlet at the port of Santos (q.v.). Area 91 310 sq. m. Pop. (1940 census) 7 230 000 (Its numbered over 1 000,000) (1945 estimate) 8 047 000.



SÃO PAULO THE PLAZA AND THE VIRIÚ MONUMENT

In the background is the Martelli building of twenty five storeys

2 Cap. of the above state and 4th cond. city of Brazil stands at an elevation of nearly 3000 ft. on the Serra do Mar plateau, 200 m. S.W. of Rio de Janeiro and 45 m. from Santos, its port. A wealthy well constructed city noted for its palatial buildings and private residences and is the quickest growing city in the world. The centre of the city, which embraces the dists. of Rua Direita, São Bento, Quinze de Novembro and Praça Antonio Prado is continually extending into new dists. with an ever increasing number of fine buildings. Many broad thoroughfares have recently been driven through the overcrowded areas of narrow streets. The most notable of these is the five traffic way, Anhangabau, in the heart of the city, which leads into the Avenue 9 de Julho and thence through the tunnels to the outskirts. Among the public buildings are the cath-

edral, the gov. offices the episcopal palace, and the magnificent Iparanga palace, now a museum, which was built on the spot where Brazil declared her independence of Portugal, 1822. The commercial quarter, containing the banks, offices, and shops, is contained within a central area (called the Triangle, and this is gradually developing into the commercial hub of Brazil. The fortunes of the city are founded on the two great state products, coffee and cotton. It is the industrial centre of the state of S. P. with cotton, woollen, jute, boot, hat leather chemical, cement and glass factories, breweries, printing works distilleries foundries, flour mills and beverages. The new municipal stadium in the Pacembí valley is the most up to date sports arena in S. America and holds 100 000 spectators. The new and palatial Jockey Club and racecourse was opened in 1941. A large municipal theatre was opened in 1910, and the Santana is the other prin. theatre. S. P. enjoys a healthy climate and is well served by railways and has a good water supply. The ann. temp. averages 69.3° F. for the warmest and 57.9° F. for the coldest, months. It is this favourable climate, coupled with the geographical position of the town, that attracted so many Portuguese and Sp. settlers. The town was founded by two Jesuit priests on Jan. 25, 1554 who gave it the name of S. P. in honour of the patron saint of the day. The white pop. grew rapidly and racial difficulties arose. The Indians attacked the town but unsuccessfully in 1580. The seat of government of the Portuguese in the captaincy of Santos was moved to S. P. in 1481 and in 1711 the town was raised to the status of a city by decree of John VI king of Portugal. The pop. in 1920 was 379 000 to Rio de Janeiro's 1 000 000 in 1947 it was 1 776 000 against Rio de Janeiro's 1 931 000. See G. A. Last *Facts about the State of São Paulo*, 1928.

Saophis, see KHAIIRA

Sao Salvador da Bahia, see BAHIA

Sao Thome, see under St THOMAS

Sao Vicente, see St VINCENT

Sao Vicente, maritime vill. state of São Paulo, Brazil opposite Santos. It was the first settlement of the Portuguese in America.

Sap, watery fluid which is in constant flow in living plants. Crude S. is that which has been absorbed from the soil by the root hairs and carries with it the various dissolved food substances required by the living cells for constructive purposes after being elaborated in the leaves. Sapwood, splintwood, or alburnum is that part of a tree which conducts S.

Sap (Lat. Lat. *sapa*, hoe of Gk. *σαπτή* to dig) in military engineering, the name of the trench which is dug in the operation of *sapping*.

Sapajou, name given to some New World monkeys of the genus *Cebus* and family Cebidae.

Saphar, month of the Islamic calendar corresponding to the period Nov.-Dec.

Sapodilla (*Sapota achras*), tropical evergreen tree bearing large white flowers

followed by an edible fruit, which is valued in the W. Indies.

Saponaria, genus of ann. and perennial plants (family Caryophyllaceae). *S. officinalis*, common soapwort, is a tall plant with broad, pointed leaves and handsome and conspicuous cymes of flesh-coloured flowers. Sev. species are grown in the garden. *S. ocymoides* (rock S.), a useful plant for a rather shady rockery, bears rosy-purple flowers.

Saponification, in soap manuf. the conversion (hydrolysis) of fats into soap by the use of ammonia, soda, or potash; since different amounts of the alkali are needed for different oils and fats, the S. value is used to determine the identity and purity of the latter. In organic chem. S. is the resolution of acids and alcohols from esters (q.v.).

Saponite, see ROCK-SOAP.

Sapotaceae, family of tropical trees and shrubs, some of which bear edible fleshy fruits containing nut-like seeds.

Sappan Wood, wood of *Cæsalpinia sappan*, a native of S. Asia, used as a dye. 'Sapper,' see MCNEILE, CYRIL.

Sapphire, variety of corundum (Al_2O_3). It includes all corundum gemstones other than red (named ruby). S. without colour adjective refers to blue S., those found in Kas. and Burma named for colour. The yellow S. should not be called oriental topaz, the green S. not oriental emerald, the mauve S. not oriental amethyst. All are true S., as is the pink S. The star S. reflects six rays, due to light striking colloidal or other inclusions arranged in lines. Good stones are obtained in Siam, Burma, and Ceylon; others in Montana, U.S.A., and Anakie, Queensland.

Sappho, Gk. poetess, b. in Lesbos, probably at Mitylene, towards the end of the seventh century B.C. She was a friend of Alcaeus the poet. It is surmised that, owing to a quarrel with the statesman Pittacus, she fled to Sicily about 596 B.C., but she returned to Mitylene and led a circle of poets, among them Erinna of Telos. She is often known as the 'tenth muse,' and her lyrics, which are mostly written in Sapphic strophe, a form popularised by Horace, are unsurpassed for their warmth and passion no less than for their elegance and superb technical finish. They are of subjective lyrical character and convey much that is valuable to form a true conception of her life and personality. There is no justification for the legend of her leap from the rock of Leucas in a fit of hopeless passion for Phaon. Of S.'s writings, only two odes and 100 or so fragments and odd lines remain. Strictly, some 170 fragments are attributed to S. But of these about a score are not certainly authentic, and one or two are too mutilated to yield any coherence. Broadly the subjects of the extant fragments may be classified as follows: her social life; her philosophy of life; allusions to Nature and its beauties; epithalamia or bridal songs; invocations and references to deities; her claims to immortality as a poetess; personal and miscellaneous poems. It is conjectured that her total output was not less than 8000 lines, and

of this there has survived less than the equivalent of 500 lines, or about 2000 words. But, although the extant fragments are small, posterity has a tolerable idea of her personality, and not only from internal evidence, as, for example, from the very famous lyric to a beloved girl describing, in burning words and riotous imagery, the whole passion of love (which poem is preserved for moderns by the so-called Longinus in his treatise *On the Sublime*, and quoted or imitated by Horace, Lucretius, Plato, Theocritus, Lucian, and, in our own times, Tennyson), but also from what is stated about her by anct. writers.

There is a very considerable literature on S. Among anct. writers who left valuable extracts from or criticisms of the poems are Aristotle, Plutarch, Dion of Prusa, Maximus Tyrinus, Galen, and Aristides the Sophist. Among modern writers are J. M. Edmonds's ed. of S. in the *Lyra Græca*, 1922-27; E. Lobel's ed., containing Schubart's additional fragments (1925); and the excellent comprehensive ed., *Sappho: the Poems and Fragments*, by C. H. Haines, in the Broadway Trans. series (1926). See also Bilis Carman, *Sappho*, 1911; U. von Wilamowitz-Moellendorf, *Sappho und Simonides*, 1913; D. M. Robinson, *Sappho and her Influence*, 1924; A. Weigall, *Sappho of Lesbos*, 1932; and H. Rodiger, *Sappho, ihr Ruf und Ruhm bei der Nachwelt*, 1933.

Sapporo, or Satsuparo, tn., cap. of the is. of Yezo, Japan, on the Ishigaki R. Prior to allied bombing attacks in the Second World War it had an agric. college, a museum, botanical gardens, and various manufacturing industries. Pop. 196,500.

Saprolegnia, see under SALMON.

Saprophytes (Gk. *sarpos*, decaying; *phos*, a plant) are plants, not confined to any one group, but most numerous among the fungi, which being wholly or partly devoid of chlorophyll and chloroplasts are unable to manuf. the carbon compounds necessary for their nutrition from carbon dioxide and water. They therefore derive their food from dead plants and animals, as distinct from parasites which are dependent upon living hosts for their sustenance. But no strict definition can be made, for a great number of plants obtain some of their carbon compounds from organic matter in the soil, and on the other hand some parasites are able to exist as S. for a considerable period, while not a few live first as true parasites until they kill their host, and then obtain nourishment from its decaying tissues. An instance is *Stereum purpureum*, a fungus which is the cause of silver-leaf of plum and other trees. Its fructification never appears till the wood is dead. Dry-rot of timber is caused by a saprophytic fungus (*Merulius lacrymans*); others are the moulds of jam, cheese, and other foods. But on the whole S. are very valuable scavengers, rapidly clearing the earth's surface of objectionable matter, breaking it down into simple compounds which are available for the nutrition of green plants.

Among higher plants the fir-rape or 'pine-bird's nest' (*Hypopitys*) and many of the orchids, including the Brit. bird's-nest orchid (*Neottia*), are S.

Sapru, Sir Tej Bahadur (1875-1949), Indian lawyer and statesman, b. in Kashmir, educated at Agra College, was enrolled as an advocate of the high court, Allahabad, in 1896. A lawyer of outstanding eminence, he played a great part in Indian political and social progress for more than a generation. His earliest political affiliations were with the National Congress. Under the Morley-Minto constitution he was a member of the United Provs. Legislative Council, 1913-16, and thereafter for four years of the Imperial Legislature. Having founded the Liberal party, S. came to London in 1919 to support the Montagu-Chelmsford reforms. From 1920 to 1923 he was a member of the viceroy's executive council. K.C.S.I. 1923. He visited London in 1923 for the Imperial Conference, and again in 1927 to discuss the composition of the Simon Commission. S. was one of the most influential of the Indian representatives at the Round Table Conference, and it was largely owing to him that the conference, instead of ending in deadlock, reached a decision broadly acceptable to both sides. He again travelled to London in 1933 to confer with the Joint Select Committee of Parliament on the proposed Indian reforms. Privy Councillor, 1934. In the 1939-45 war S. supported co-operation with Britain. During the long negotiations from which the two states of India and Pakistan emerged he sought, as usual, to exercise a moderating influence on his countrymen, but his proposals gained support from neither Hindus nor Muslims.

Sapucasia Nut, finely flavoured, nutritious, and easily digested oval nut of *Lecythis ollaria*, the largest Brazilian tree.

Saraband, slow, stately dance, at one time popular in Spain, France, and England, said to be of E. origin. In Spain the dance was attacked by Cervantes for indecency, and was for a time suppressed by Philip II. In England it was transformed into an ordinary country dance. In a purely instrumental form it became the slow movement of the suite (*q.v.*).

Saracenia, Side Saddle Flower, or North American Pitcher Plant, genus of perennial bog plants, with tubular, reticulated, pitcher-shaped leaves and drooping blooms with a curious five-partite, umbrella-shaped style. *S. purpurea* is sometimes grown in sheltered, moist rockeries, and other species in a moist, cool greenhouse.

Saracenic Architecture, see ARCHITECTURE, *Mohammedan*.

Saracens, name given by Gk. writers from the first century A.D. to the Bedouin Arabs who lived in Mesopotamia and Arabia Petraea, on the confines, that is, of the Rom. and Persian empires. It was the customary name given by Christians of the Middle Ages to their Muslim enemies in E. Europe. See also CRUSADES; MOHAMMED; SALADIN. See S. Ockley, *History of the Saracens*, 1708.

Saragossa, Duke of, see PALAFOX Y MELZI, JOSE DE.

Saragossa, or Zaragoza, prov. and its cap. in N. Spain. The prov., which has an area of 6611 sq. m., is watered by the Ebro and its tribs. the Jalon, Huerva, and Arba. In the Sierra de Moncayo (to the S.W.) is a peak 7707 ft. high. The fertile soil yields good crops of cereals. Wines, live-stock, oil and flour are the staple exports. Calatayud is the only tn. besides the cap. with over 10,000 inhab. Pop. 637,100. The city, which was once the cap. of Aragon, lies on the Ebro, 212 m. by rail N.E. of Madrid. The Celtiberian name for the city was 'Salcluba'; the modern name is a corruption of 'Cesarea-Augusta,' a name received in 25 B.C. S. has a univ. (1474), and is an important trade centre; manufs. include glass, porcelain, machinery, and iron goods. In the Sp. civil war the insurgents made a concerted and successful rising here and in Seville, Cadiz, and Pamplona on July 18, 1936, being hailed by many as the saviours of the country from Communism. Pop. 268,000.

Sarajevo, Serajevo, or Sarayevo (the Bosna-Serai of the Turks), cap. of the *banovina* or co. of Drinska in Yugoslavia. It is picturesquely situated in the valley of the Miljacka, latitude 43° 54' N., longitude 18° 25' E., 122 m. S.W. of Belgrade. Like Belgrade and Zagreb it is semi-oriental, having a pop. which is mostly Muslim and sev. mosques, some of which are famous. The tn. was founded by the Hungarians in about 1263, and is a centre of sev. faiths. One of the two provs. into which the Lat. Church of Yugoslavia is divided is at S., which has four suffragan sees (the other prov. is at Zagreb). It is also the seat of a Serb Orthodox Metropolitan. With its many wooden houses and handsome mosques, it is a strikingly picturesque tn., but now contains numerous modern features, including a training college, gymnasium, school of law for Muslims, etc. It manufs. silk, pottery, carpets, embroidery, and textiles, and has a sugar-beet factory and timber yards. It was at S. that the Archduke Francis Ferdinand was assassinated on June 28, 1914, an event which had so profound a bearing on the First World War. See WORLD WAR, FIRST and also FRANCIS FERDINAND, ARCHDUKE, and AUSTRIA-HUNGARY. In the Second World War it was captured by Marshal Tito's Yugoslav troops from the Gers. on April 6, 1945. Pop. 118,100.

Sarajoglu Shukri (b. 1890), Turkish statesman, jurist, and economist, b. at Adonis. He was a personal friend of Atatürk, and his influence has had most to do with Turkish foreign policy and, latterly, the chief problems of domestic policy, since 1938. Former minister of finance and delegate to Paris for the negotiations on the Ottoman debt, S. was minister of justice, 1932-38. As foreign minister, 1938-42, he negotiated the Anglo-Turkish alliance, 1939. He was Prime Minister, 1942-46. It was S. who decided at the end of 1943, after the retirement of F.-M. Çakmak, that the chief

of the general staff should in future be answerable to the Prime Minister. In addition, it was due to S. that the evolution from the one-party system towards democracy made rapid strides from 1945, and rendered imperative the revision of the status of the army. This evolution continued after S. had ceased to be Prime Minister, and thus for the first time in Turkish hist. the armed forces of the country, by virtue of Bills passed in June 1949, were placed under civil authority and control.

Saran, or Sarun, dist. of Bihar and Orissa, India; produces rice and cereals, sugar, indigo, and poppies. Area 2670 sq. m. Pop. 2,400,000.

Sarapis, see SERAPIS.

Saratoga Springs, health resort in Saratoga co., New York, U.S.A., 39 m. N. of Albany. It has some thirty carbonated mineral springs beneficial for rheumatism and dyspepsia, and a fine climate. The S. S. Authority was estab. in 1933 to develop facilities. The Saratoga spa treats chronic disease and physical and nervous strain. Mineral waters are bottled here, and furniture, drugs, silk, and paper-making machinery are manufactured. Here Burgoyne surrendered to Gates (Oct. 17, 1777) after two fiercely contested battles. The convention of Saratoga, as the capitulation of Burgoyne was called, the Eng. undertook to embark for England immediately, but the convention was not ratified by Congress and the surrendered men were kept prisoners of war until the conflict ended. Pop. 13,700.

Saratov, name of a region and its cap. in the R.S.F.S.R. The region has an area of 32,624 sq. m. It comprises part of the central tableland of Russia, which is here from 700 to 900 ft. above the sea, and which is cut by waterless ravines. The Volga traverses the region. The mean temp. ranges from 11.5° F. in Jan. to 72.1° in July, the average being 42.1°. The rainfall is about 14.9, and periodic droughts are usual. Serdobsk, Balashov, Khvalinsk, and Novo-Uzensk are tns. of importance. The tn. of S., administrative centre for the region (61 per cent of which is rural), is on the Volga, 532 m. by rail from Moscow. An important centre for trade and commerce since the seventeenth century, S. possesses the largest combine-harvester works in Europe, in addition to machine-building factories, which specialise in the making of Diesel engines, lathes, ball-bearings, oil refineries, and flour and textile mills. Its commercial and industrial importance was enhanced by the construction of a bridge across the Volga at S., and the completion of the Uralsk-Ilietsk railway, giving access to the S. Urals and Kazakhstan. It has large textile manufactories, based on the cotton imported from Central Asia and the coal and iron of the Ukraine and Donbas. Sunflowers and fruit are cultivated, and there are distilleries. It is an important railway junction, at which cargoes of grain, wool, fruit, and cloth, etc., are transferred from boats to the railway running eastward to Moscow. There is a univ. which was estab. before the revolu-

tion. S. was superseded by Stalingrad as the administrative centre for the entire lower Volga region in 1931. Pop. 1,799,000; (tn.) 376,000.

Saravati, in Hindu mythology, the goddess of speech, eloquence, music, and learning.

Sarawak, Brit. crown colony in the N.W. of Borneo, with an area of 50,000 sq. m. and a coast-line of 450 m. Between 1883 and 1946 S. was an independent state under Brit. protection, having originated as a separate state in 1842 when Muda Hassin, sultan of Brunel, ceded it to Sir James Brooke (q.v.), who became rajah. The last rajah was Sir Charles Vyner Brooke, who succeeded in May 1917. Sev. mts. rise above 8000 ft., and many of the rvs. are navigable. Kuching, the cap. (31,000 inhab.), on the Sarawak R., and Sibn, on the Rejang R., are the most populous tns. There is a considerable oil-field at Miri and Bakong in the Baram dist., and a refinery at Lutong. Coal is abundant; experiments in the mechanised production of rice have been undertaken. The revenue is derived chiefly from customs, royalties on oil and timber, and land revenue. Coffee, rubber, pepper, camphor, sago, etc., are produced, as well as copper, manganese, antimony, and diamonds. The pre-1939 gov. opium farms have been abolished. There are no arterial roads or railways, but there are over 420 m. of metalled and earth roads. There are wireless stations at Kuching, Sibn, Miri, and at numerous other tns. and a telephone system. Pop. (including Malays, Dyaks, Kenyahs, Kayans, and Muruts) is estimated at about 500,000. On Sept. 24, 1941, a new constitution was introduced by which the former Supreme Council became the rajah's Executive Council, and the sole power to legislate was vested in the rajah, acting with the advice and consent of the Council of Negri. The Executive Council under this constitution consisted of not fewer than five members, a majority of whom must be members of the S. civil service. The Council of Negri comprised twenty-five members, fourteen being officially appointed from the civil service, and eleven unofficial representatives of the people, including members of the Chinese community and of the native tribes. Soon afterwards the Allies were at war with Japan, and on Dec. 16, 1941, Jap. forces landed at Miri and Lutong, from which Brit. detachments had been previously withdrawn after putting the oil wells and refinery out of action. Jap. bombers raided Kuching on Dec. 19 with damage to property. By Dec. 23 the enemy was in occupation of the cap. On June 21, 1944, Australian troops landed at Lutong unopposed (see further under PACIFIC CAMPAIGNS OR FAR EASTERN FRONT IN SECOND WORLD WAR).

The government of part of the present ter. was, as indicated above, obtained in 1842 by the Brooke family. Various accessions were made between 1861 and 1905. Under an agreement of 1888 S. was put under Brit. protection. A supplementary agreement of Nov. 1941 made

provision for the appointment of a Brit. representative with certain limited powers. Following the liberation from the Jap. the rajah again took over his administration from the Brit. military authorities (April 1946), but he had previously proposed to the Brit. Gov. the cession of the ter. to the Brit. Crown. Since 1835 there had been two advisory bodies, the Supreme Council and the Council of Negri, and, as mentioned above, by the constitution of 1911 these councils were vested with powers comparable to those of an orthodox Brit. colonial executive and legislative council respectively. But there can be little doubt that an independent state of S. was a survival out of place in the more closely integral Malaya, which emerged after the interlude of Jap. occupation. The anachronistic period of paternal despotism could not endure, and the Brit. Gov. felt impelled in future to concern itself more intimately with S. than in the past. The Council of Negri, on May 17, 1946, authorised the Act of Cession by nineteen to sixteen votes, and the Act was signed in the same month. The administration is now in the hands of a Brit. governor. The first governor of S. was Sir C. A. Clarke, who was transferred to the Gold Coast in 1949, being succeeded by D. G. Stewart, financial secretary to Palestine. The now governor had been only a few days in S. when he was fatally stabbed in Sibu (Dec. 3) by a Malay youth.

See S. Baring Gould and C. A. Bampfyde, *History of Sarawak, 1839-1908*, 1909; C. Hose and W. McDougall, *Pagan Tribes of Borneo*, 1912; E. Owen Rutter, *British North Borneo: an Account of its History, Resources, and Native Tribes*, 1922, and *Pagans of North Borneo*, 1929; C. Hose, *Fifty Years of Romance and Research*, 1927; T. Harrison (ed.), *Borneo Jungle: an Account of the Oxford Expedition to Sarawak*, 1938; Agnes Keith, *Land Below the Wind* (N. Borneo), 1939; and Rance of Sarawak, *The Three White Rajahs of Sarawak*, 1939.

Sarcoma (transliteration of Gk. *σάρκωμα*, which is derived from *σάρκωσις*, to become fleshy, and *σάρξ* = flesh), malignant tumour (cancer); made up of embryonal mesoderm, nuberous carcinomata are formed from ectoderm or endoderm (i.e. epithelial tissue of the skin or mucous membrane). S. are further distinguished from carcinomata by their being composed mainly of cells with little connective tissue; the blood-vessels are numerous, but are not so highly organised. They may be classified as round-celled, spindle-celled, melanotic, and myeloid, according to the nature of their cells. Melanotic S. are composed of cells containing melanin, a black pigment. Myeloid S., or myelomata, are composed of giant cells like those of bone-marrow, and are found only in the interior of bones. S. are disseminated by the blood-stream, carcinomata commonly by the lymph channels; secondary S. are therefore most often found in the lung. See also CANCER.

Sarcophagus (Gk. *σάρκοφαγος*, flesh-eating, from *σάρξ*, flesh, and *φαγῖν*, to eat), stone receptacle for the dead. The

curious name, according to Pliny, is derived from a caustic property possessed by a certain stone found at Aesos in Throe; corpses interred in coffins of this material were believed to be consumed within forty days. One of the earliest and most noteworthy S. is that of Seti, who reigned in Egypt from 1326 to 1300 B.C., wrought out of a solid mass of aragonite and semi-translucent; it is now preserved in the Soane Museum, London. In the Brit. Museum is an Etruscan S. dating to 500 B.C.; the Etruscans used terra-cotta, and carved their coffins either in the form of a couch with a recumbent figure of the dead, or of a diminutive shrine. These and the Sdon S., found by Humdy Bey in 1887 (now in the Imperial Museum at Constantinople), are some of the finest in existence. The oldest-known Rom. S. is that of Scipio in the Vatican, which dates in the third century B.C., and other good examples are the Peuthesilea S., also in the Vatican, and the Niohid S. in the Lateran. On Rom. coffins, of which a great number have survived, will be found the appropriate legends of Prometheus and of Psyche and Eros. A valuable Rom. S. was discovered in Gabbary, suburb of Alexandria, in May 1949, during building operations by the Salt and Soda Company in the auct. region of the Necropolis; 285 cm. long, 132 cm. wide, and 191 cm. in height, it is much larger than any similar object in the Greco-Rom. Museum at Alexandria. It is of greyish-white marble, beautifully sculptured, and claimed to be the best type of S. of its kind known in Egypt. Most of the details portrayed on the sides are connected with the cult of Dionysus. At one end is the head of a satyr, and at the other a magnificently executed head of the satyr Silenus. On one of the long sides are Mnemns and three well-wrought heads of the Gorgons, and between these the bust of a bearded Sorapis and the youthful form of Dionysus. Under the influence of Constantine the Great, when Christianity became the official state religion of the Rom. Empire, stone S. were widely used, and a great impetus was given to figure sculpture in Europe.

Sarcosine, or Methyl-glycine (CH₃-NH-CH₂-COOH), was obtained by Liebig by boiling creatine with baryta water. It is similarly produced from caffeine. Volhard prepared it synthetically from chloroacetic acid and methylamine. It forms rhombic crystals, soluble in water (melting-point 210-220° C.) with both basic and acid properties.

Sard, reddish-brown kind of chalcedony, which, like carnelian, derives its colour from iron oxide. Its natural colour may be improved by heating. The S. is often carved as a seal and worn set in a ring. S. is found in Baroda, India, and Brazil. It is much rarer than carnelian and therefore much more valuable.

Sardanapalus (668-626 B.C.), probably Gk. corruption of the Assyrian Assurbanipal (q.v.).

Sardae, see SARDIS.

Sardine, term long applied in Mediterranean countries to young pilchards (*Clupea pilchardus*), and in recent years

especially to those prepared in Brittany and packed in oil in a tin hermetically sealed. It has also been applied to bristlings or young sprats (*C. sprattus*) similarly preserved in Norway, where the plichard is unknown. Other species of *Clupea* are the W. Indian poisonous S. (*C. thrissa*) and the Pacific or Jap. S. (*C. sagax*). Some 400,000 cases of S. are exported annually from Canada. They are caught chiefly in the bay of Fundy.

Sardinia (It. *Sardegna*), is. in the Mediterranean, belonging to Italy. It is about 160 m. in length and 68 m. wide. In size it is the sixth is. of Europe and the second is. of the Mediterranean Sea, ranking next to Sicily. The strait of Bonifacio, separating it from Corsica to the N., is 7½ m. wide, and Civitavecchia, which is the nearest point on the It. mainland, lies 138 m. to the N.E. In the south is the gulf named after Cagliari, the cap., and between this and the gulf of Oristano on the W. lies the low, fertile, but malarial plain of the Campidano; the gulfs of Asinara and Orosai are the chief indentations on N. and E. respectively. S. is in great part mountainous and partly volcanic. Punta Lumaromora (6030 ft.) and Punta Bruncu Spina (6034 ft.) in Gennargentu, Monti Corrassai (4827 ft.), Bunta Berittu in the Monti Linbara (4494 ft.) in the N.E. and Monti del Goceano (4154 ft.), Monti di Lanusei (4091 ft.), and Monte Lihua (4068 ft.) are the highest peaks. The Tirsu, Flumendosa, and Coghinna are the chief rivs., all of which are rapid torrents, dry or almost dry in the summer. Many excellent harbours, including Cagliari, Terranova, Carloforte, Porto Torres, and Alghero are found along the indented shores. Famous as a granary under the Rom. Empire, S. still produces wheat, barley, maize, pulses, potatoes, lucerne, tobacco, and saffron, though not in great quantities, besides wine (chiefly in the prov. of Cagliari), olive oil (chiefly in Sassari), and fruits. Although only 3½ per cent of the Sardinian area is not 'productive,' i.e. 96½ per cent is dedicated to agriculture and forestry, 51 per cent of the soil is used for pastures, and only 26.8 per cent produces crops. Cattle, sheep, goats, horses, and many pigs are reared. Forests cover about 5 per cent of the area; some thirty-eight plant species are indigenous to S. alone and about the same number are elsewhere found only in Corsica. The native fauna includes moultons, stags, wild boars, and flamingos. Zinc, silver, copper, lead, and lignite are mined in the S.W. There are also tunny and sardine fisheries. The chief exports are wine, olives, fish, charcoal, salt, and minerals. There are some 300 m. of railway of normal gauge (besides some 600 m. of narrow gauge) linking the chief tns., Cagliari, Iglesias, Oristano, Sassari, Alghero, etc., and motor services are expanding, though the roads of the interior are still very poor. Cagliari, damaged during the Second World War (pop. 111,000), and Sassari (pop. 67,900) are the seats of univs. S. has many interesting prehistoric remains, particularly stone fortresses known as *nuraghi*, which

are commonly considered as belonging to the Bronze Age. Recently, however, it has been suggested by the It. archaeologist Pallottino that the Sardinian *nuraghi* may belong to the eighth to sixth centuries B.C. S. was conquered by the Carthaginians, after their victory over the Gks. at Alalia (537 B.C.), and by the Romans in 238 B.C., who made it a prov. After suffering from the repeated ravages of Goths and Vandals, it passed into the possession of the E. Rom. Empire. In later times it was harassed by the Saracens, but in the eleventh century it became a kingdom, though in 1190 it had to recognise the supremacy of Pisa, which was, however, contested by Genoa. Aragon next captured it, 1323-26. Ruled by a Sp. viceroy, 1478-1713, it then passed to the emperor, and finally to the duke of Savoy in 1718, who then took the title of king of S. When his descendant, Victor Emmanuel II., became king of Italy in 1861, the kingdom of S., which had been in existence since 1164, ceased to exist. Its ports were bombed by the R.A.F. sev. times in the autumn of 1941. Area 9302 sq. m. Pop. 1,216,000. See D. Goldring, *Sardinia, the Island of the Nuraghi*, 1930, and M. Pallottino, *La Sardegna Nuragica*, 1950.

Sardis (Gk. Σάρδεις), cap. of the auct. kingdom of Lydia and of the Rom. and Byzantine prov. of Lydia, from A.D. 295 was the seat of a metropolitan bishop. It fell successively a prey to the Chimerians (seventh century B.C.), the Persians under Cyrus (546 B.C.), the Athenians and Ionians (498 B.C.), Antiochus the Great (215 B.C.), and finally Timur (A.D. 1402). In the days of its prosperity it was famous for its carpets and woollen goods, and was an *entrepôt* for the traffic between Persia and Europe.

Sardonx, see ONYX.

Sardou, Victorien (1831-1909), Fr. dramatist, was b. in Paris, and was at first intended for the medical profession. His early attempts at play-writing failed; he suffered much privation, and fell ill of typhoid fever, but was nursed through sickness by an actress, Mlle de Biécourt, whom he then married, and by her he was introduced to Mlle Déjazet, for whom he wrote sev. successful sketches, such as *Monsieur Garat* (1860). He then continued to produce all forms of drama at an astounding rate, and becoming one of the most popular writers of his kind, he speedily amassed a considerable fortune. For Sarah Bernhardt he wrote *Fédora* (1883); *Theodora* (1884); and *La Tosca* (1887). He was elected to the academy in 1887. See J. A. Hart, *Sardou and the Sardou Plays*, 1913, and G. Mouly, *La Vie prodigieuse de Victorien Sardou*, 1931.

Sargans, tn. of the canton of St. Gall, Switzerland, on the railway between Chur and Wallenstadt. Pop. 1,800.

Sargasso Sea, part of the N. Atlantic Ocean between 40° and 70° W. lat., and 20° and 35° N. long., noted for its seaweed (*Sargassum micriferum*), first noticed by Columbus in 1492. Maj. James Kennell (1832) assumed that the weed was brought from the gulf of Mexico by the Gulf

Stream, but Baron von Humboldt thought that it was produced on vast beds at the bottom of the ocean from which it broke away in a matured state. The Ger. botanist, Meyen (1834), however, advanced the theory that the plants had never been attached to the sea-bed or rocks. The *Sargassum* weed is not a large plant, and single specimens vary in size from small fragments to bushy plants a foot long. Practically all the plants belong to the main varieties, *S. natans* and *S. fluitans*. Prof. O. Winge describes how the weed tends to subdue the waves and, seen from a distance in a breeze, the *Sargassum* flotillas lie like smooth strips in contrast to the ruffled surf of the surrounding ocean. Most of the plants in the S. S. have grown vegetatively, and are able to multiply themselves indefinitely by partition. The literature of the S. S. is not very accessible, and even the main facts have remained rather obscure. Much light has been thrown on the origin of the drifting weed by Prof. Parr, Prof. Winge, and others. See O. Krummel, *Die nordatlantische Sargassosee*, 1891; J. Murray and J. Hjort, *The Depths of the Ocean*, 1912; O. Winge, *The Sargasso Sea, its Boundaries and Vegetation* (report of the Dan. Oceanographical Expedition, 1900-10), 1923; L. Germain, *La Mer des Sargasses*, 1935; and *Geographical Journal*, Jan. 1942.

Sargent, Sir (Harold) Malcolm (Watts) (b. 1895), Brit. conductor, educated at Stamford School. Having studied the organ at Peterborough Cathedral (1911-1914) he became organist at Melton Mowbray (1914-24), meanwhile taking his doctorate of music at Durham Univ. (1919) and studying the piano under Moiseiwitsch (1919-21). From this time S. began to distinguish himself as a choral and orchestral conductor. In 1922 he was appointed conductor to the Leicester Symphony Orchestra and Choral Society, and in the following year became conductor of orchestral classes and prof. at the Royal College of Music. In 1928 S. accepted the position of conductor-in-chief of the Royal Choral Society. Since then he has held posts as official conductor of the London Symphony, Hallé, and Liverpool Philharmonic orchestras, and he has appeared in all the prin. concert halls of the world. In 1942 S. received the honorary doctorate of music at Oxford Univ., and was knighted in 1947.

Sargent, John Singer (1856-1925), Amer. portrait painter, b. in Florence, son of Dr. Fitzwilliam S., physician, of Boston, Massachusetts, U.S.A. He studied in Florence, and in Paris under Carolus Duran, also in Germany and Italy, achieving fame by a portrait of Duran in 1877. He had a studio in Paris about 1880-81, after which he lived chiefly in England. For twenty-five years he held attention by his portraits of celebrities and the non-celebrated. Roosevelt, Rockefeller, Chamberlain, Ada Rehan, the Sp. dancer Carmenita, and Ellen Terry were among his subjects. A famous full-length is 'Lord Ribblesdale,' in the National Gallery. Among his most notable works are his mural decorations at Boston Public

Library. In the Tate Gallery is a specimen of his work outside portraiture: 'Carnation, Lily, Lily, Rose,' painted 1885. A.R.A., 1894; R.A., 1897.

Sargon ('the legitimate king'), king of Assyria, reigned from 722 to 705 B.C., when he was assassinated. A general in the Assyrian army, he usurped the crown on the death of Shalmaneser IV.; this usurpation explains, perhaps, why one long procession of battles fills his reign. Having captured and depopulated Samaria, he crushed revolts of Palestine and Damascus, and of the Egyptians and Philistines in 720. Between 719 and 714 he defeated the Hittites, Mosch, Minni, Medes, Tibaren, Cilicians, and also Rusus of Ararat. Finally, having worsted Merodachbaladan, he seized the crown of Babylon.

Sark, one of the Channel Is., 6½ m. E. of Guernsey, has an area of about 1300 ac., and comprises two peninsulas, Great and Little S., joined by the Coupée, a narrow, natural, and elevated causeway. A new harbour was opened on June 23, 1949. There is an abundance of fish and sea-fowl, and some agriculture. Its striking caves and cliffs attract a number of visitors. S. has its own constitution and has a seigneur. Motor cars are not permitted in the island.

Declared demilitarised in 1940. S. was occupied by the Gers. on July 1. The seigneur of Sark and some of the pop. were deported to Germany. There was a commando raid on the is. on the night of Oct. 3-4, 1942, and liberation was achieved on May 9, 1945, military government existing until Aug. 25. Pop. 570.

Sarmatians (Lat. *Sarmatæ* or *Sauro-matæ*) were an ant. people, akin to the Scythians in speech, and probably Iranian by stock, who inhabited Sarmatia, i.e. those regions of modern Russia which stretch from the Vistula and the Danube to the Volga and Caucasus. The Alans were a Sarmatian tribe who ravaged the E. Rom. Empire (third century A.D.).

Sarnen, tn. of Switzerland, cap. of Obwalden (S. half of Unterwalden), on the R. Aa, 13 m. S. of Lucerne. Altitude 1556 ft. Pop. 3500.

Sarnia, port of entry and cap. of Lambton co., Ontario, Canada, on the St. Clair R., 50 m. W. of London. It has the largest oil-refinery of the Brit. Empire, lumber mills, a synthetic rubber plant, chemical and glass factories, machine-shops, threshing machines, steel and iron factories. Pop. 40,000.

Sarno, tn. in the prov. and 13 m. N.W. of the port of Salerno, Italy. It has manufs. of textiles, wine, paper, and leather, and there are mineral springs. The Ostrogoths under Teias were routed here, in 553, by an army of Justinian under Narses. Pop. (com.) 25,000.

Sarolea, Charles (b. 1870), Belgian administrator and scholar, b. at Tangres, and educated at the Royal Athénée, Masselt, and at Liège Univ., where he distinguished himself in classics and philosophy. Having been awarded a travelling scholarship by the Belgian Gov., S. spent two years (1892-93) of further study in Paris, Palermo, and Naples; and in 1894

he was appointed first lecturer and head of the Fr. and Romance Dept. at Edinburgh Univ. During the First World War S. travelled widely, appealing for Belgian relief, and in 1920 he accompanied King Albert as his political adviser on the royal journey to Brazil and W. Africa. He is the author of numerous works on political and literary subjects, including studies and lives of Ibsen (1891), Victor Hugo (1911), Tolstoy (1912), Joan of Arc (1918), and Masarvk and Lincoln (1920).

Sarongs, coloured cotton cloths of plain weave exported for dress to Malaya, Java,

The Time of Your Life (the latter awarded the Pulitzer prize, which he rejected). *The Human Comedy* (1943) has been filmed. Other works include *Dear Baby* (1914) and *The Adventures of Wesley Jackson* (1947).

Sarpedon, in Gk. legend, the son of Laodamia and Zeus. A Trojan champion, he was slain by the Gk. Patroclus in the ten years' war, but Apollo saved his body from dishonour.

Sarpi, Paolo, *see* PAUL, FATHER.

Sarpsborg, tn. and port in the fylke of Østfold, S.E. Norway, on the Glommen, 68 m. by rail S.E. of Oslo. Water-power is



SARK: CREUX HARBOUR

F.V. 4.

Burma, etc. A sarong consists of a few yards of cloth with a coloured heading near each end; it is wound closely round the body.

Saronio Gulf, *see* AEGINA.

Saronno, tn. of the prov. of Varese, on the R. Lura, in Lombardy, Italy, 14 m. N.W. of Milan. Pop. (com.) 29,200.

Saros, cyclic period of 223 lunar months (i.e. 18 years 11 3 days), discovered by the Chaldeans. If eclipses of the sun or moon are recorded on one period of the cycle, a similar eclipse at the same period in the next cycle can be predicted. S. was the number 3600 in the Babylonian numerical system.

Saroyan, William (b. 1905), Amer. writer, b. at Fresno, California. His *The Daring Young Man on the Flying Trapeze* (1934) showed his originality and force of writing. His plays aroused controversy by this realism; in 1942 he began a theatre of his own in New York. In 1939 he pub. *My Heart's in the Highlands* and

supplied from the great falls at Sarpsfoss to sev. factories, including chemical works, sawmills, and cellulose and paper estab. Much timber is exported. Pop. 13,000.

Sarre, *see* SAAR.

Sarrebouurg, tn. of Lorraine, France, on the Saar, R. 44 m. N.W. of Strasburg by rail. It has manufs. of gloves, lace, beer, and watch springs. The battle of the Snar was fought there in Aug. 1914, when Dubail entered the tn. with his army and held it for four days. In the Second World War it was captured by troops of Gen. Patch's Seventh Amer. Army on Feb. 22, 1945. Pop. (1939) 9000.

Sarrebrück, *see* SAARBRIJCKEN.

Sarreguemines, or Saaregemines (Ger. Saargemünd), tn. of Lorraine, France, at the junction of the Rs. Blies and the Saar, 40 m. E. of Metz; before the Second World War it had manufs. of pottery, silks, plush and velvet, matches, and papier-maché boxes. S. was a centre of severe fighting in Jan.-Feb. 1945,

particularly when the Gers. cut the road from the tn. to Haguenau, thereby threatening the Saverne Gap, with the recapture of Strasbourg their objective (Jan. 5, 1915). Soon afterwards S. was captured by Gen. Patch's Amer. troops. Pop. (1939) 15,000.

Sarrelouis, see SAARLLOUEN.

Sarsaparilla, roots of various species of the genus *Smilax*, especially *S. officinalis*, a native of Central America, from which the long spirally twisted rhizomes are imported in bundles. Many medicinal virtues are claimed for it, and a drink, bright pink in colour, is made by boiling the dried roots. Among the numerous substitutes is the root of *Hemidesmus indicus*.

Sarsfield, Patrick, Earl of Lucan (c. 1645-1693), Irish Jacobite commander. He served with the Eng. army in France, and fought ably at Sedgemoor (1685) and the battle of the Boyne (1690). After forcing William III. to raise the siege of Limerick (1690), he was allowed to retire to France. He fought in Flanders, and was mortally wounded at Neerwinden (1693). See life by J. Todhunter, 1895.

Sarthe, dept. of N.W. France, traversed N. to S.W. by the Sarthe R., which joins the Loire below Angers after a course of 175 m. The dept. was formed (1790) out of parts of Maine-et-Loire and Anjou provs., and is divided into three arrons.: Le Mans, La Flèche, and Mamers. Cereals, potatoes, poultry, cider, and perry are produced. Its horses resemble the Percheron breed. Iron, coal, marble, slate, and limestone are found, and there are industries connected with them. Hemp and linen are still manufactured in parts. Cap. Le Mans. Area 2110 sq. m. Pop. 412,200.

Sarto, Andrea del, see ANDREA DEL SARTO.

Sarto, Giuseppe Melchiorre, see PIUS (popes), Pius X.

Sartre, Jean-Paul (b. 1905), Fr. novelist, dramatist, and philosopher, b. in Paris. He was the son of a naval officer and was educated in Paris, graduating from the univ. in 1929; he was a schoolmaster at Le Havre, at Laon, and then at the Condorcet, Paris. He fought in the Second World War, was taken prisoner in 1940 but repatriated during the war, and in Paris, during the Ger. occupation, pub. an unsuccessful political pamphlet, *Socialisme et liberté*. He then produced two plays, *Les Mouches* (1913) and *Huis clos* (1944). His name in the subsequent years was chiefly associated with the philosophy known as Existentialism (q.v.), which became a vogue, especially after the liberation of Paris, among the embittered and frustrated youth. He is a novelist of great fecundity and flow of words, a playwright able to sustain themes apparently devoid of dramatic interest, and a political journalist with opinions on most contemporary problems in a Paris paralysed and pessimistic after the war. His plays are widely trans. and produced in many countries. He edits *Le Temps modernes*. His other works include psychological studies, *L'Imagination*

(1936), *Esquisse d'une théorie des émotions* (1939), and *L'Imaginaire* (1940). His first novel, *La Nausée* (1938), appeared as *The Diary of Antonine Roquentin* in 1949; his plays include *Morts sans sépulture* (1946) and *La Putain respectueuse* (1946); and he has written a novel in three parts, *Les Chemins de la liberté* (1944-47).

Sarts, name for the settled (as opposed to the nomadic) inhab. of regions in Turkestan, Persia, and Afghanistan. The Tajiks, being always settled, or tn.-dwellers, were the first to be known as S.; whence the long prevalent erroneous impression that the word had a racial meaning, implying an Iranian as opposed to a Türkic element.

Sarum, Old, was the Rom. Sorbiodonum, the site of which is about 2 m. N. of Salisbury. The bishopric of Sherbourne was translated there c. 1078. Bishop Herman's cathedral, begun c. 1067, was burned down in 1092; the building was renewed by Bishop Roger. It gave its name to the famous Sarum Ritual. In 1220 the present cathedral (see SALISBURY CATHEDRAL) was begun at New Sarum, now Salisbury (q.v.), whither the see migrated in 1227 perhaps because of disputes with military authority. Remains of the Norman walls still exist and excavations have revealed the whole ground plan of the cathedral and much more of interest to the archaeologist. This site was in succession a prehistoric camp, a Rom. station, a Saxon and a Norman tn. It is now in the custody of the Ministry of Works as an anct. monument. Notwithstanding the fact that almost no electors remained, O. S. remained a parl. bor. until 1832, and was the classic example of the 'rotten bor.'

Sarum Use or Rite, the manner of conducting the liturgy according to the books compiled by Osmund, bishop of Salisbury (1078). It is classed by liturgists as a variant of the Rom. rite: the Sarum mass is of considerable interest as showing us the stage of development reached by the Rom. rite before the reforms of Gregory VII. In contrast however with Rom. tradition, the use of Sarum is elaborate, there being mention of frequent and grand processions, with three, five, or seven deacons, and as many subdeacons, three cross-bearers, etc. It was used in the S. of England and most of Scotland and Ireland, but became obsolete at the Reformation. Traces of it remain in the selection of Sunday gospels in the Anglican Book of Common Prayer and the Rom. Catholic form of marriage service in England. See *Sarum Missal* (Cambridge, 1880); *Sarum Breviary* (Cambridge, 1896); and *Frere, Use of Sarum* (Cambridge, 1898).

Sary-kul, see VICTORIA, LAKE.

Sarzana, tn. in La Spezia, Italy, 6½ m. E. of Spezia, built on the site of anct. Luna. It has a cathedral built in the fourteenth century, and is the bp. of Pope Nicholas V. The chief products are olives and wine; bricks and glass bottles are made. Pop. about 15,000.

Sasin, see BLACK-BUCK.

Sasine, see INFERTMENT.

Saskatchewan, prov. of Canada lying

between parallels 102° 110' W. and 49° 60' N., and bounded on the N. by the N.W. Terr., S. by the U.S.A., E. by Manitoba and W. by Alberta. Together with Alberta S. was formed under Acts of 1905 out of the southern portion of the N.W. Terr., and admitted into the dominion as such on Sept. 1, 1905. Area 251,700 sq. m. (of which 13,725 are water). S. lies in the heart of the prairie land, at an elevation of from 1500 to 3000 ft. above sea level. N. of the rolling prairies are large forest tracts, thinning off towards the N. boundary. The southern portion of S. resembles the adjoining part of Manitoba, being more or less gently rolling prairies, usually treeless, while the S.E. portion is almost flat. The rainfall is light in some parts, but modern farming methods and irrigation have enabled settlers to produce splendid crops. The N. and S. Saskatchewan Rrs., which rise in the Rockies, the Qu'Appelle, the Carrot, the Beaver, and the Churchill in the N. are the chief rivers. The rivs. intersect the prov. from E. to W.; the Qu'Appelle runs for its entire course through a rich agric. country, amidst fine scenery. In the N. are the lakes, the largest being Athabaska and Reindeer, each some 1500 sq. m., and in and around them fish and furs are abundant. In the N. there are fine park lands, with plenty of open prairie and 'bluffs' or coppices of birch and poplar. The rainfall in this part is generally heavier than in the S., and the country is dotted with lakes and creeks, the scenery being extremely attractive. The climate of S. is clear and bracing; the summer days are frequently hot, but the heat is tempered by refreshing breezes. In winter it is very cold, but the stillness of the air and the dryness mitigate the rigour. The fertility of the soil is almost inexhaustible, and the agric. industry of S. has made phenomenal progress. The soil is a rich loam, from 8 in. to 20 in. deep over a chocolate clay subsoil. Near some of the rivs. in the more hilly sections the soil is lighter, with some stones and gravel, and areas of light timber. Though the land area is about 1,660,000,000 ac., only a relatively small part (about 80,000,000 ac.) has been brought under cultivation.

S. has the largest acreage under grain crops of any prov. in Canada, that under wheat alone being twice the acreage of Alberta, of between 10 and 12 million ac. The acreage under oats varies from 4½ to 6½ millions, and that under barley from 1½ to 3½ million. S. also has easily the largest acreage of the field crops, rye and flax seed. In parts of the prov., as in Alberta, stock-raising is still carried on as a primary industry, whereas the live-stock production of the dominion at large is for the most part a subsidiary of mixed farming. In 1915 the total value of all farm products was \$624,608,000. In mineral production S. takes a much lower place among the provs., but in 1945-46 the value had reached \$24,000,000 as against only \$11,500,000 in 1940. The minerals exported include copper, gold, silver, cadmium, selenium, tellurium, coal, zinc, natural gas, phosphato, sodium sul-

phate, and clay products. Lignite deposits occur in the N., notably at Estevan and Belly R. The lumbering dists. are N. of Prince Albert, the chief timber being spruce, larch, jack-pine, white and black poplar, and white birch. The timber is used largely for railway sleepers and the needs of settlers. Lake and riv. fish include whitefish, sturgeon, and pike; also pickerel and trout. Prin. fur-bearing animals are bear, otter, beaver, marten, wolf, and mink. Prince Albert and Battleford are the centres of the fur trade, the ann. value of which has reached \$2,000,000. The prov. is traversed by three lines of railways, the total track mileage being nearly 9000. Education, both primary and secondary, is free and supported by the gov. and by local taxation. Collegiate institutes or high schools exist in every important centre of the prov. Normal schools for training of teachers are maintained at Regina and at Saskatoon. The Univ. of S., situated at Saskatoon, grants degrees in arts and science, pharmacy, agriculture, law, and engineering. S. has sixteen members in the Federal Parliament and six in the Senat. The prov. gov. is vested in a lieutenant-governor and a legislative assembly of fifty-two members, elected for five years. The judicial system consists of a court of appeal with a chief justice and four justices, a king's bench with a chief justice and six puisne judges and a score of judicial dists. with as many judges appointed by the dominion gov. The prov. gov. appoints the magistrates. The seat of gov. is at Regina, which was the cap. selected by the prov. itself, and was formerly the headquarters of the Mounted Police. Pop. (census 1946) 332,688; (estimated 1948) 854,000. The chief tns. are Regina (named in honour of Queen Victoria), 64,100; Saskatoon, 43,000; Moose Jaw, 23,000; Prince Albert, 11,300; Weyburn, 7000; Swift Current, 6300; Yorkton, 5700; N. Battleford, 5700; Battleford, Biggar, Estevan, Melville, Maple Creek, Humboldt, Indianhead, Moosemin, Kam-sack, Rosthern, Assiniboia, Canora, Mel-fort, Watrous, Shannavon, and Wolseley, all of which derive their importance mainly from being situated in the mid-st of a rich agric. country.

The area comprised in modern S. was a valuable one in the early and flourishing times of the W. fur traders, and it is commonly said that the first white man to go there was Henry Kelsey, a servant of the Hudson's Bay Company, who exploited the interior towards the latter part of the seventeenth century. Fifty years later Fr. rivals built Fort Paskovoye on the Saskatchewan R., and Fort à la Corne to the W. In this period the Chevalier de la Corne commenced agric. activities in the Carrot valley. Then in 1771 Cumberland House, the first trading post built by the Hudson's Bay Company in the interior, was estab. on the Saskatchewan R., and soon afterwards a number of other posts were set up by the company and by its great rival, the North West Company. In the vicinity of these posts half-breeds made settlements, but settlements generally in

S. did not really begin until the late nineteenth century, when the combined companies' tracts had been acquired by the dominion. The building of the Canadian Pacific Railway and the influx of settlers, combined with other causes, led in 1885 to something in the nature of a rebellion, which was only terminated by the battle of Batoche. This rebellion prejudiced any large-scale settlement on the W. prairies for some time, until the Laurier Gov., through the initiative of Sir Clifford Sifton, carried out a strong immigration policy, when at last the vacant spaces of the prairies of S. began to be occupied.

Founded in 1882, Saskatoon is the centre of a rich agric. area. There are manufacturing plants connected with agriculture and producing flour, linseed oil, glycol, glucose, mixed feeds, etc., and there are also ironworks, machine shops, oil refineries, chemical and concrete plants, and other industrial establs. Hydro-electric power is available. It is the trade centre of the whole prov., with fifteen railway lines and an airport. There are mineral, oil, timber, and natural gas resources near by. The univ. of Saskatchewan is located here and an agric. research laboratory. Pop. 43,000. See



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SASKATOON AND THE SASKATCHEWAN RIVER

See N. F. Black, *History of Saskatchewan and the old North West*, 1913; E. H. Oliver, *The Beginning of White Settlement in Northern Saskatchewan* (transactions of the Royal Society of Canada), 1925; A. L. Burt, *The Romance of the Prairie Provinces*, 1930; G. E. Britnell, *The Wheat Economy*, 1939; C. A. Dawson and Eva R. Younger, *Pioneering in the Prairie Provinces*, 1940; and other publs. of the Royal Society of Canada.

Saskatchewan River is formed by two branches, N. and S., both rising in W. Alberta. It flows E. to Lake Winnipeg and thence to Hudson Bay as the Nelson or Katchewan R. Riv. steamers can ascend to Edmonton. The name is derived from the Cree word *Kisiskatchewan*, meaning 'rapid riv.' or 'swift current.' Length 1200 m. See F. Yeigh, *Through the Heart of Canada*, 1911.

Saskatoon, city of Saskatchewan, Canada, on the S. Saskatchewan R., 450 m. N.W. of Winnipeg and 300 m. S.E. of Edmon-

narratives of Saskatoon, 1882-1912 (Univ. Book Store, Saskatoon), 1927, and J. H. Archer, *Historic Saskatoon*, 1948.

Sassafras, large deciduous tree (*S. officinale*, family Lauraceae), native of N. America, bearing racemes of greenish-yellow flowers, and from the aromatic root-bark of which an essential oil used by perfumers is obtained. The dried root is used in pharmacy, and a type of beer is made from young shoots.

Sassanidae, or **Sassanians**, Persian dynasty, A.D. 226-641, who were continually at enmity with the Romans. Ctaphon (q.v.) was their cap., but the religious centre of the Zoroastrian priesthood was Istakhr. The founder of the line was Ardashir or Artaxerxes, who conquered Parthia and Media, and took the title of king of kings. In attacking Rome's Asiatic possessions he was defeated by Alexander Severus (d. 241), and was succeeded by his son Shapur (Sapor) I. He defeated and kept captive for life the Rom.

emperor Valerian, but met with resistance from Odenathus and Zenobia of Palmyra. Shapur II. persecuted the Christians of Syria, made war on Constantine, Julian the Apostate, and Jovian, and tried to subdue Armenia. Yazdegerd I. tolerated the Christians, and in 408 made peace with Rome. Bahram, or Varanes V., nicknamed the Wild Ass from his love of hunting the animal, reigned from 420 to 438. He was beaten by Theodosius, and in his reign 100 years' peace was signed between the Romans and Persians, the latter paying tribute. In Bactria the Persians had to struggle against the White Huns. Kavadh, the next monarch, invaded Mesopotamia, but, being attacked by the Huns, made peace with Rome in 506. Chosroes I. followed, fought the Romans, ruled from the Indus to the Red Sea, and left a reputation for justice and learning. Chosroes II., Heraclius, and Yazdegerd III. were the last rulers, Yazdegerd being finally overthrown by the Muslims. See A. Christensen, *L'Empire des Sassanides*, 1907, and *L'Iran sous les Sassanides* (2nd ed.), 1941.

Sassari: 1. Prov. of Italy, forming part of Sardinia. There is some mining, and cereals, tobacco, wine, oil, and fish are produced. Area 2900 sq. m. Pop. 345,800. 2. Cap. of the above prov., 9½ m. S. of the Gulf of Asinara. It is a univ. town, has a veterinary college and an old cathedral, the latter gravely damaged during the Second World War. It is a gold- and silver-mining dist. Pop. 67,900.

Sassoon, Sir Jacob Elias (1841-1916), Brit. banker and merchant, grandson of David S. of Baghdad, a Jew who migrated to Bombay early in the nineteenth century, and son of David S., of E. D. Sassoon Company. Jacob developed the cotton industry of W. India. He was made a baronet in 1909, and was succeeded by his brother, Edward Elias (1853-1924).

Sassoon, Sir Philip Albert Gustave David (1888-1939), Brit. politician, educated at Eton and Christ Church, Oxford. In 1912 was elected M.P. (Conservative) for the Hythe div. of Kent. During the First World War he was private secretary to F.-M. Sir Douglas Haig, and he was under-secretary for air, from 1924 to 1929, and again from 1931 to 1937. He was first commissioner of works, 1937-39. Pub. *The Third Route* (1929). He was deeply interested in flying, and did much to encourage civil aviation. A connoisseur of art, he was a trustee of the National Gallery, Wallace Collection, and Tate Gallery.

Sassoon, Siegfried Lorraine (b. 1886), Eng. poet and writer, brother of Sir Philip S. He is distinguished for the incisiveness and disillusion of *War Poems* (1919) and *Satirical Poems* (1926), and later for the charm of *The Heart's Journey* (1928). His prose work, *Memoirs of a Fox-hunting Man* (1928), was awarded the Hawthornden prize, and *Memoirs of an Infantry Officer* (1930) is a sequel to it. Other works include *Figals* (1935); *The Old Century* (1938); *The World of Youth* (1942); *Siegfried's Journey*, 1916-20 (1945); and *Mr. Meredith* (1948).

Satalieh, see ADALIA.

Satan, see DEVIL.

Satara, dist. and tn. of Bombay prov., India, lying to the E. of the W. Ghats; pulses and grains are grown. The tn. is situated 55 m. S. of Poona, manufs. brassware, and has Mahratta monuments and the noted 'sword of Sivaji.' Area of dist. 4891 sq. m. Pop. 1,327,000; of tn. 22,500.

Satellite, name given to the small companion body or moon revolving round most of the planets. The earth has one S. (the moon), Mars two, Jupiter eleven, Saturn nine, Uranus five, and Neptune two. All apparently rotate, and their periods of rotation and orbital motion are believed to coincide. The S. of Uranus and Neptune, three of Jupiter, and one of Saturn have retrograde motion.

Satellite Towns. The first satellite tn. designed and built as such was Welwyn Garden City in 1920, which was intended to be a satellite tn. of London, showing how development of residence, industry, and agriculture should take place in the London area. Welwyn Garden City was a garden city in the same sense as Letchworth, founded in 1903, which has become a satellite tn. of London, though not intended as such. A satellite tn. is defined as a tn. in a real sense, having its own corporate life, providing for housing, industry, and agriculture, but in some economic or social dependence upon a large city. The policy of building S. T. was adopted by the gov. in 1916, when the New Towns Act was passed. Under that Act sites may be designated by the minister of tn. and country planning and development corporations set up for the development of the sites as New Tns. These development corporations prepare plans and carry them out under the supervision of the minister. They are financed by the Treasury, and have powers to build houses, factories, commercial, and other buildings, as well as to undertake all ancillary development. The Act provided for £50,000,000 being advanced for the purpose by the gov. The following New Tns. are in hand (1950) and others are projected: Stevenage (60,000), Harlow (60,000), Hemel Hempstead (60,000), Crawley (60,000), Hatfield (25,000), Basildon (60,000), and Bracknell (25,000), all in the London area. In addition there are schemes at Peterlee (30,000), Aycliffe (10,000), Cwmbran (35,000), and Corby (10,000), and in Scotland at E. Kilbride (15,000) and Glenrothes (30,000). Not all the New Tns. can be properly termed 'satellites,' and the expression 'satellite' is consequently falling into disuse. Welwyn Garden City has also become a New Tn. within the meaning of the Act, with the object of completing it up to a pop. of 36,500. Reports and plans made by the various development corporations have been pub. The hist. of Letchworth and Welwyn Garden City and an account of the New Tns. schemes is contained in *The Building of Satellite Towns* by C. B. Purdom (1949).

Sati, v. **Suttee**, Sanskrit word meaning 'a virtuous wife,' applies to a practice once prevalent among the Brahmans of India. On the death of her husband a Brahman or

high-caste widow would proclaim herself *sati*, and at the cremation throw herself over her husband's body on the funeral pyre, having first distributed her jewels among the assembled mourners. The act was regarded as a voluntary one, but public opinion forced it upon a widow of good birth, and any woman who having proclaimed herself *sati* afterwards shrunk from self-immolation was disgraced for life. Mothers of unborn babes and of children still minors were not allowed to become *sati*. The custom was prohibited in 1829 by Lord Wm. Bentinck. A related primitive custom of providing women and slaves for service in the after-life is widely known in Bronze Age Britain, in Europe, Malaysia, and N. America, and in Negro Africa.

Satie, Erik (1866-1925). Fr. composer and journalist. b. at Honfleur. Both his parents were composers, and S. studied at the Paris Conservatoire, though only for a year. Later he made a precarious living by writing music for the song-writer Hypsa and the music-hall singer Paulette Goddard. About 1890 he made friends with Debussy, and at the age of forty took up studies at the Schola Cantorum under Roussel and d'Indy, continuing to produce small piano-forte works under eccentric titles. Later he came into contact with Jean Cocteau and estab. a school at Arcueil, exercising some influence on younger composers, including Poulenc, Honegger, Auric, and Milhaud. His works include a symphonic drama, *Sorcerer* (1920), ballets, operettas, sev. piano-forte pieces, four sets of songs, etc. See life by P. D. Templier 1932, and study by R. Myers, 1948.

Satin, lustrous silk fabric woven so that the warp and weft cross each other only occasionally, the weft being brought uppermost, and thus giving a continuous soft, bright surface. The best S. has a dull silk or wool silk back: cotton-backed S. is generally called 'sateen'. Fr. Protestant refugees brought the manuf. of S. to England in the seventeenth century, though the material was known in the thirteenth.

Satin Bird, see BOWER BIRD.

Satin Spar, name given to the fibrous varieties of gypsum (CaSO₄ · 2H₂O), and also to a compact and fibrous calcite. It has a satin-like lustre, is formed in veins in rocks, and is used for ornamental purposes.

Satinwood, wood of (1) *Persea guianensis*, which is very light coloured, and is used in the making of furniture and cabinet work; (2) of *Chloroxylon zanzibaria*, which is less white and is used for building purposes.

Satire, literary production in which men, manners, actions, or beliefs are attacked with irony, sarcasm, or ridicule. Various forms include epigram, allegory, burlesque, farce, and parody. The *satira* of Lat. literature was, in the hands of Ennius, a dramatic medley, but as developed by Lucilius, Horace, Persius, and Juvenal it became synonymous with social, political, literary, or personal criticism. Personal criticism has been universally regarded as the lowest form of S. The first two Eng. satirists, Langland (*Piers Ploughman*) and Chaucer (*Canter-*

bury Tales, *Tale of Sir Thopas*), could hardly be more unlike, the one with his righteous indignation at the selfish noble, the other with his broad humorous tolerance of all men and women. A century later the 'flying' poems of Skelton and Dunbar often verged on brutality. The early Elizabethans were too exuberant and imaginative to be critical of each other or of the society in which they lived. Towards the end of that emotional period a reaction set in, and an intellectual view of life became prevalent. To this period belonged Ben Jonson, Donne, Marston, and Hall. S. reached its summit in England in the so-called Classical Period, when the chief exponents were Dryden, Pope, Swift, Addison, and Samuel Johnson. The nineteenth century produced fewer but greater satirists (notably Lamb, W. S. Gilbert, and Thackeray), and saw the founding of the world's greatest satirical jour., *Punch*, in 1841. Among contemporary satirists whose names will probably live may be numbered Shaw, Chesterton, Beerbohm, Quiller-Couch, E. V. Rieu, and A. P. Herbert. In late decades milder and more popular S. has spread from literature into radio (Kavanaugh's *Humor*) and films (T. E. B. Clarke's *Passport to Pimlico*). In most European countries S. has followed similar lines at different periods. In Ger. literature the peaks of S. included Lessing's moral S. on religious intolerance, Goethe's fables with satirical implications and pungent epigrams, Heine's extremely wounding attacks on many cherished Ger. characteristics, Büchner's biting mockery of respectability, and Kästner's childlike themes with occasionally fierce social implications. The three greatest names of Fr. S. are Rabelais, with his thundering laughter at the Renaissance; Molière, with his ridicule and hatred of sham and pomposity; and Voltaire's cutting indictment of the gov. In Spain Cervantes's *Don Quixote* stands supreme, though it develops into a masterpiece simply for the character-drawing it contains; much the same may be said of the Norwegian Ibsen's *Peer Gynt*, which, however, the author claimed was a poetic fantasy first and foremost, and only incidentally a S. The Czech brothers Capek rank with the greatest of satirists, with their wry comments on the human race in general. In *The Good Soldier Schweik*, by Hasek, also a Czech, there is extravagantly comic S. on military tyranny and pomposity. Amer. literature has had a vast number of satirists, the greatest of whom include Washington Irving, Mark Twain, and in this century Damon Runyon, Don Marquis, Robert Benchley, and James Thurber. The Canadian Stephen Leacock wrote many stories and essays full of relentless humour. See W. Hazlitt, *English Comic Writers*, 1819; R. M. Alden, *Rise of Formal Satire in England under Classical Influence*, 1899; O. Smeaton, *English Satire*, 1899; H. Wolfe, *Notes on English Verse Satire*, 1929; and C. E. Vulliamy, *The Anatomy of Satire*, 1950.

Satmar, see SZATMAR-NEEMETHY.

Satpura, tableland of the Central Provs.

India, 100 m. wide. Its highest point is 4500 ft.

Satrap, in the anct. Persian monarchy, the name given to a governor of a prov. whose duties, defined by Darius I. (sixth century B.C.), were to collect taxes, superintend the work of minor officials, and administer the law.

Satsuma, former prov. of Japan, on the is. of Kiushiu, now part of Kagoshima. The S. clan was one of three clans from which F.-M. Saigo organised the Imperial Guards in 1870. The noted S. ware is a kind of cream-coloured Jap. pottery, so glazed as to give a crackled effect. Modern S. ware has little value. Genuine old S. falence pieces are small, with minute crackle, decorated with enamel colours and matt gold, of delicate design slightly raised.

Satsuparo, see SAPPORO.

Saturation: 1. *Saturated solution* is a solution that can remain indefinitely in equilibrium with undissolved solute. 2. *Saturated compounds* are compounds incapable of forming derivatives by direct addition (e.g. methane, CH_4) as opposed to unsaturated compounds (e.g. ethylene, C_2H_4) which will combine with elements or other compounds to form addition compounds. Thus ethylene combines with bromine to form ethylene dibromide: $\text{C}_2\text{H}_4 + \text{Br}_2 = \text{C}_2\text{H}_4\text{Br}_2$. In general unsaturated compounds are more chemically active than saturated compounds.

Saturday, seventh day of the week. *Saturni dies*, which was dedicated by the Romans to Saturn (O.E. *Sæternesdæg*). As the sabbath it is the weekly rest-day of the Jews, and is also kept as such by certain Christian bodies, including the Seventh-day Adventists.

Saturn, the most remote of the planets known to the ancients, but the sixth in order from the sun of those now known. Its mean distance from the sun is 886,000,000 m.; the eccentricity of its orbit, 0.056, gives a varying distance of about 50,000,000 m. on either side of the mean. Inclination of orbit to the ecliptic $2\frac{1}{2}^\circ$; sidereal period 29½ years; synodic period 378 days. The planet is very much flattened at the poles, the ellipticity being about 10 per cent; its equatorial diameter is about 75,000 m.; polar 67,000 m.; mean diameter 71,000 m. Its diameter is more than 9 times that of the earth, with surface 84 and volume 763 those of the earth respectively. Its density is, however, only one-eighth that of the earth, being about 0.70 that of water, the least of all the planets. The plane of its equator is inclined to the plane of its orbit at an angle of $26^\circ 45'$. The surface shows a bright zone at the equator, sev. duller bands in other lat., and poles occasionally greenish. White or greyish spots occur at times, and observation of these shows the period of rotation to be 10 hrs. 14 min. (Hall, 1876) near the equator, to 10 hrs. 38 min. in higher lat. (S. Williams, 1893). The spectrum shows that the atmosphere of S. consists mainly of ammonia and methane, somewhat similar to Jupiter's atmosphere; and in other ways, such as the blanket of clouds, there is a resemblance to Jupiter. The clouds on the planet are arranged in

bands, but in a more irregular manner than those on Jupiter and are less distinct, as might be expected from the greater distance of the planet. It is believed that a thick layer of ice lies underneath the atmosphere and a rocky core underneath the ice, but this is largely speculation. From the low density of the planet it must be assumed that a considerable portion of its surface is gaseous, and its solid surface is thousands of miles below the visible surface.

Saturn's Rings.—Galileo observed peculiarities in the planet's appearance in 1610, but Huygens in 1655 was the first to resolve the rings. Cassini in 1675 noted the double nature of the ring, and Bond in 1850 (also Dawes independently), discovered the innermost 'crape' or 'gauze' ring. The diameter of the ring system is 171,000 m., according to Lowell's measurements, but this does not imply that the rings occupy this space because this measurement is taken through the planet and also the empty portion between the surface of the planet and the inner crape ring. The width of the outer ring A is 10,000 m., and there is a gap about 3000 m. wide, known as the Cassini div., after Cassini, who discovered it. Next comes the bright ring B, which is 18,000 m. wide, and inside it is a gap of 1000 m., separating the inner portion of B from the outer portion of C, the crape or dusky ring which is 11,500 m. wide. From the inner portion of this ring to the surface of S. is about 7000 m. Once in about every fifteen years the rings are invisible, their plane being edgewise to the earth; the thickness there, probably is not greater than 100 m. That the rings are composed of swarms of meteors was mathematically demonstrated by Clerk Maxwell in 1857, and confirmed spectroscopically by Keeler in 1895, and by others since (see SPECTRUM). Spurr showed that the mass of the rings is inappreciable. Kirkwood has shown that the gaps and lines are due to perturbations produced by S.'s satellites.

Phases.—Twice in the revolution of S. the rings are turned edgewise to the earth, and twice, at the points half-way between the nodes, they are seen at maximum width. The transit of the system across the earth's orbit occupies 360 days, during which the crossing occurs once or three times, when the rings are absolutely invisible. For sev. weeks they are visible only in very powerful instruments as needle-like prominences. There are usually two such disappearances in the critical year.

Satellites, in order of distance, are:

	Discovered	Revolution		
		Days	Hrs.	Min.
Mimas . .	1789	0	22	37
Enceladus .	1789	1	8	53
Tethys . .	1684	1	21	18
Dione . .	1684	2	17	41
Rhea . .	1672	4	12	25
Titan . .	1655	15	22	41
Hyperion .	1848	21	6	39
Iapetus . .	1671	79	7	54
Phoebe . .	1898	550	10	48

The revolutions of all the satellites around S. are direct except Phœbe, which has retrograde motion. On photographs Phœbe appears to be retrograde.

Saturn, Rom. god, *see* CRONUS.

Saturnalia, *auct.* Rom. festival, held in Dec. in honour of Saturnus. It began on Dec. 17, and lasted for seven days, being probably originally an agric. festival to celebrate the end of the vintage and harvesting. It was a season of universal rejoicing, merriment, and licence, during which no business was transacted. Slaves sat at table with their masters, or were actually waited on by them, and the utmost freedom of speech was allowed to them.

Saturnian Verse, earliest native verse of the *auct.* Its later ousted by Gk. metres. Macaulay compares it with the nursery-rhyme, 'The queen was in her parlour, eating bread and honey.' There was doubtless much licence allowed in the scansion. For fragments from Nævius, Livius Andronicus, Ennius, and others *see* F. W. Ritchie, *Saturniæ Prescos Itelliquæ*, 1854, and F. Leo, *Der Saturnische Vers*, 1905.

Saturnus, *see* CRONUS.

Satyamara layate (Truth alone triumphs), motto included in the Indian state emblem and seal, as being acceptable by all religions, and as a statement of Mahatma Gandhi's chief principle.

Satyrs (*Satyræ*), class of beings in Gk. mythology, half man and half beast, haunters of the woods and mts., inseparably connected with the worship of Dionysus. They represent the luxuriant vital powers of nature. The older ones were known as Sileni, the younger as Satyrisci. They were often represented with goats' ears, horns, hoofs, and tails. Later writers confused them with the It. Fauni. *See* A. Furtwängler, *Der Satyr aus Pergamon*, 1880.

Sauchieburn, *see* under JAMES III.

Sa'ud, Abdul Asiz' (III. of Nejd) ibn (born c. 1880), king of the Hejaz, b. at Riyadh, central Arabia, son of Abdulrahman, who was a younger son of Faisal, sultan of Nejd, 1834-67. On the death of Faisal, Ibn Rashid, representing a rival dynasty, came south, and drove out the Wahabi dynasty, to which Ibn S. belonged. His father led an unsuccessful rising in 1900; Ibn S. next year surprised and took Riyadh, and was proclaimed sultan of Nejd. The Turks continued to support his rivals, whom he defeated in 1904; by 1908 he was secure in his sultanate. In 1913-14 he turned the Turks out of the E. prov. of El Hasa. His efforts on the side of the Brit. early in the 1st World War were unsuccessful. Thereafter, in defiance of Britain, he successfully fought Hussein, king of the Hejaz, over the possession of Khurman. Having defeated his N. foes in 1920, and extended his boundaries elsewhere in 1922, he invaded the Hejaz in 1924. Hussein abdicated in favour of his son, who left Mecca to the Wahabis in Oct. On Jan. 8, 1926, Ibn S. was proclaimed king of the Hejaz. Nejd and its dependencies were added to that kingdom in 1927. In 1932 he unified his

possessions under the name of Saudi Arabia (*q.v.*). A few years later he waged a successful war against Yahia, the Imam of the Yemen, and added a portion of that ter. to his own kingdom.

Like every Arabian empire-builder from Mahomet on Ibn S. derives his force from his religious enthusiasm, and he combines with it great practical qualities. By settling the Bedouins on the land and purging their customs of feud, and by settling feudal agric. brotherhoods in colonies all over the country which render



IBN SA'UD

E.N.A.

certain military services in return for agric. and religious instruction, he laid the foundations of his enduring regime. The Nejd confronted him with internal problems only; but his possession of the Hejaz and Mecca, to which the faithful from all Islam annually repair, brought him international complications, for many Muslims, averse from Wahabism, looked upon his seizure of Mecca as impious. But his diplomacy, his devout way of life, and his capacity for religious toleration have long since convinced his co-religionists that he is a trustworthy guardian of their holy places. *See* Ameen Rihani, *Ibn Sa'oud of Arabia*, 1928, and H. C. Armstrong, *Lord of Arabia*, 1934.

Saudi Arabia, or **Saudia**, Arabian kingdom, comprising the Hejaz and Nejd, and the principality of Asir, and so named by decree of Sept. 20, 1932, under which Abdul Asiz ibn Sa'ud (*q.v.*) effected or confirmed the unification of his sultanate of Nejd with his kingdom of Hejaz. There

is, however, as yet no single constitution for the whole kingdom, and the dual character of Ibn Sa'ud's realm is emphasised by the fact that there are still two caps., Mecca and Riyadh. The administration of Nejd is that of an absolute monarchy of the patriarchal kind under a viceroy and commander-in-chief (at present Ibn Sa'ud's eldest son and his heir apparent) without the assistance of a cabinet. The Hejaz, on the other hand, is still theoretically administered under the constitution of 1926 which, as amended, provides for a council of ministers under the presidency of the king's second son, who acts as viceroy in his father's absence. The constitution makes provision for instituting advisory councils, comprising a consultative legislative assembly in Mecca, municipal councils in Medina (Madina) and Jeddah, and vil. and tribal councils in the provs. The religious law of Islam is the common law of both divs. of S. A.

The Nejd ('-plateau') has no definite frontiers, nor are those of the Hejaz sufficiently definite to yield a precise estimate of its area. The Nejd may be said to stretch over some 800,000 sq. m. of central Arabia, and eastward to the Persian Gulf; and its pop., largely nomad or Bedouin Muslims of the Wahabi sect, is supposed to be about 3,000,000. The Hejaz ('-the boundary,' i.e. between Nejd and Tihamah) stretches from Asir in the S.W. of the Arabian peninsula to Transjordan in the N., and from the Red Sea and the gulf of Akaba in the W. to a vaguely defined frontier in central Arabia. The total area of the Hejaz is given variously as 112,000 sq. m. to 150,000 sq. m., and the pop. as ranging from about 1,500,000 to 3,000,000, including many Bedouin tribes.

The chief industry of the Nejd is camel and sheep breeding. Agriculture is not much developed, but wheat and barley are grown, as well as dates and other fruits. Other products include hides, wool, *ghee* (i.e. clarified butter), and *abas* (cloaks), and oil, found in Hasa, is being exploited by an Amer. company. The exports are *abas*, dates, hides and skins, and horses and other live-stock, but the whole export trade is insignificant. Medina produces excellent dates, and the oasis of Taif produces honey; but the exports of the Hejaz are also quite undeveloped, and the economic life of the country depends on the pilgrimages to the holy cities of Medina and Mecca (see MEDINA; MECCA). A Brit. company is exploiting the anc. gold mines located in the hills of the Hejaz. There are various levies and a small regular army, and in 1937 a ministry of defence was instituted, together with an officers' training school. Apart from the 46 m. asphalted road from Jeddah to Mecca, completed in 1941, there is no recognised road system in S. A. Motor transport uses a track from Mecca via Riyadh to the Persian Gulf, a distance of over 800 m., and there is a similar route from Jeddah via Rabigh to Medina. Motor transport can also travel between Riyadh and Kuwait and Haifa, between Jauif and the N., between Jeddah and Dhaha, and

between Sabya and other places. The course of the Hejaz railway is from Medina, through the Syrian desert, to Damascus and Beirut; the portion of the railway S. of Mu'an in Transjordan is not at present in use. The Eng. gold sovereign is in practice the basis of the currency. In 1928 a new silver currency, the *riyal*, was substituted for the old Turkish *mejidie*. The chief tns. of Nejd are Riyadh (pop. 30,000), Hafuf (cap. of Hasa), on the Persian Gulf (30,000), Buraida and Haifa (each 20,000), Anaisah, Shagra, and Hanta. The only ports are Qatif and Ugair, suitable only for sailing craft, but the Amer. oil company has its own deep-water port at Ras Tamura. In the Hejaz Mecca has a pop. of 80,000, Jeddah 30,000, and Medina 20,000. Jeddah is the chief port and serves Mecca; Yambo' is the port for Medina; smaller ports are Rabigh, Muwala, and Wedj. The oasis of Khairah has a considerable pop., descendants of former African slaves, with a centre at Kasr el Yalindi. Asir ('the Inaccessible') was regarded by anc. Arab geographers as a part of the Yemen. It extends from Birk on the S. boundary of the Hejaz to the N. boundary of the Yemen. The maritime lowland is fertile near the wadis and affords good pasturage. The chief tn. is Abu Arish (8000).

By the treaty of Jeddah, signed on May 20, 1927, Great Britain recognised S. A. as an independent kingdom. A treaty of Arab brotherhood and alliance between S. A., Iraq, and the Yemen was signed in 1936. In 1937 S. A. and the Yemen composed their differences, including those relating to frontier delimitation. In 1947 was estab. a Brit. military mission to train officers and N.C.O.s of the Saudi Army. See also ARABIA; HEJAZ; NEJD. See H. R. P. Dickinson, *The Arab of the Desert*, 1948.

Sauerkraut, form of preserved vegetables, much eaten in Germany and N. Europe. It is prepared from white or red cabbage, which is cut up into thin slices, with sprinklings of salt, juniper berries, carraways, or other condiments between the layers. The whole is then pressed down in a wooden cask or glazed metal jar with a heavy weight until fermentation takes place, usually in four to six weeks.

Saugor, see SAGAR.

Saubulagh, or Sujbulak, tn. in Azerbaijan, Persia, 40 m. S. of Lake Urmia. Pop. 7000.

Saul, first king of Israel, was son of Kish, and of the tribe of Benjamin. The beginning of his reign is usually placed about 1050 B.C. The account of his life given in the Books of Samuel seems to be combined from two sources, and there is at times inconsistency in the narrative. His first exploit seems to have been the deliverance of Jabesh-Gilead from its Ammonite oppressors. The rest of his reign was spent chiefly in border warfare against the Philistines. He seems to have been obstinate and given to melancholia. He quarrelled with Samuel and drove David from the kingdom. Yet his people remained faithful to him till the end. See life by the Rev. R. Sinker (Temple Bible Handbooks), 1904.

Saul Tree, see **SAL TREE**.

Sault Sainte Marie: 1. City of Ontario on the Canadian side of the St. Mary's R., and of the twin U.S. and Canadian locks on the short canal between Lakes Superior and Huron, known popularly as 'The Soo' (see under **CANADA, Canals and Waterways**). It is on the Canadian Pacific and Algoma Central railways, and lies 440 m. N.W. of Toronto. It is a busy port, with steamship connection to all five great lakes, and has a prov. airfield. It has twelve public or primary schools, and six separate Rom. Catholic primary schools, a collegiate institute, a technical school, and an Indian school. There are two public libraries and two hospitals. The city owns all the public utilities, and has unlimited hydro-electric power. The leading industry is the large Algoma Steel Corporation. There are also oxygen and chemical works, railway car shops, a power company, brewery, sash and door factories, dredging and construction companies, and fishing. The neighbourhood supplies iron, gold, silver, copper, brick clay, maple, birch, and pine, the three last in great quantities. Pop. 28,000. 2. Co. seat of Chippewa Co., Michigan, U.S.A., on the St. Mary R., opposite the above tn. The commerce passing through the canals here is larger than that of any other canal in the world. There are factories making calcium carbide, leather and woollen goods, and mills. An international bridge connects it with Canada. Pop. 15,000.

Saumur, tn. in the dept. of Maine-et-Loire, France, on the l. b. of the Loire, 27 m. S.E. of Angers. It is the seat of a cavalry school, founded in 1768. Nearby are prehistoric caves, with the dolmen of Bagneux, and other Celtic remains. S. was a stronghold of the Huguenots. Tinplate, rosaries, and enamels are produced. In caves near by is matured S. wine, resembling champagne. Pop. 17,600.

Saurashtra. The United State of S., Kathiawar, India, which came into existence on Feb. 15, 1918, includes the following thirty-eight states: Nawanagar, Bhavnagar, Porbandar, Dhrangadhra, Morvi, Gondal, Jafrahad (or Janjira), Wankaner, Palitana, Dholi, Lumbdi, Wadhwan, Rajkot, Lakhtar, Sayla, Chudra, Vala, Jardan, Amarnagar, Vadia, Jathi, Mull, Bajana, Vipur, Maliya, Kotda-Sangani, Jetpur, Bilhva, Patdi, Khirasa, Vanoli, Barvala, Katodia, Lodhika, Vasavadi, Jalia Devan, Zainabad, Vithalghadi. Total area 21,318 sq. m. Pop. about 3,585,000.

Saurat, Denis (b. 1890). Fr. literary historian and writer, b. at Toulouse, was educated at the univs. of Lille, Paris, and London. He became prof. at the univ. of Bordeaux, and later of Fr. language and literature at King's College, London. From 1924 to 1946 S. was director of the Fr. Institute in London, and in 1941 led an educational mission to the Congo; he is vice-president of the International P.E.N. Club. His writings are notable for a blend of erudition, logic, and humour, and for a particularly lucid style of writing in both Eng. and Fr. On the religious

ideas of the great poets he has written *Milton, Man and Thinker* (1925); *La Religion de Victor Hugo* (1929); and *Blake and Modern Thought* (1929); on occult traditions and psychic phenomena *Death and the Dreamer* (1946); *Gods of the People* (1947); and *La Métaphysique expérimentale*; and on literary criticism *Modernes* (1935); *Modern French Literature, 1870-1940* (1946); and *Le Génie de l'Europe* (1949).

Sauromats, see **SARMATIAN**.

Sausage Bassoon, see **BACKET**.

Sausage Poisoning, see **BOTULISM**.

Saussure, Horace Benedict de (1740-99), Swiss physiologist and Alpine climber, b. at Conches, near Geneva. He was prof. of physics and philosophy at Geneva (1782-1786), and founded there the Société pour l'Avancement des Arts (1772). He travelled through the Alps, studying geology and physics, and pub. *Voyages dans les Alpes* (1779-96). He also wrote *Sur l'hygrométrie* (1793), and invented the magnetometer, cyanometer, diaphanometer, anemometer, etc. He is credited with the second ascent of Mt. Blanc in 1787. See lives by J. Seebier, 1801; by Cuyvier in *Biographie universelle*; and by D. W. Freshfield, 1920.

Saussurite, probably an impure labradorite. It is whitish in colour and the result of the alteration of feldspars in gabbro.

Sauterne, white wine, called after the vil. Sauternes, in Gironde, S. France.

Savage, Michael Joseph (1872-1940), New Zealand statesman, b. at Benalla, Victoria, Australia, settled in New Zealand as a miner in 1907. Studiously inclined and a wide reader, especially on financial topics, he entered politics through trade unionism, and was elected member of Parliament for Auckland W. in 1919. S. became the leader of the Labour party in 1933, and, in 1935, Prime Minister in New Zealand's first Labour gov., as well as minister for external affairs, native affairs, and of a number of other depts. In addition he was minister of broadcasting, 1936-1938. One of the first acts of his ministry was to pool the ministerial salaries so that those of ordinary M.P.s rose from £300 to £450, while the Prime Minister's official salary of £2000 was reduced to £500 plus £250 entertainment allowance. In 1937 he represented New Zealand at the coronation of George VI, and at the Imperial Conference. By his personal sincerity and practical qualities he won the confidence of a large majority of New Zealanders, and in 1938 he was returned to power with the loss of only one seat.

Savage, Richard (1697-1742), Eng. poet, claimed to be the illegitimate son of Richard S., fourth Earl Rivers, and Anne, wife of the second earl of Marcellfield, but this contention was never proved. He was the author of some plays, including *Love in a Veil* (Drury Lane, 1718), and *The Tragedy of Sir Thomas Overbury* (Drury Lane, 1723), in which latter he played the title-role. Among his poems are *The Bastard* (1728); *The Wanderer* (1730); *The Progress of a Divine* (1735); and *London and Bristol Compar'd* (1744).

In 1730, when Fusden died, he applied for the poet-laureateship, but that office was bestowed upon Colley Cibber. He died in poverty. A complete ed. of his works appeared in 1775. See S. Johnson, *An Account of the Life of Mr. Richard Savage*, 1741, and S. V. Makower, *Richard Savage: a Mystery in Biography*, 1935.

Savage Club, London club, founded in 1837; the club-house is 1 Carlton House Terrace, London, S.W.1. Its members are largely drawn from the circles of literature and art.

Savage Island, or **Niue**, see **NIUE**.

Savali, see **SAMOA**.

Savanna, or **Savannah**, tropical grasslands of Africa, and also the name given by the Sp. settlers to the great plains or prairies of the N. Amer. continent. These S. are situated for the most part in the interior of continents, where the conditions of rainfall and temp. are suitable.

Savannah: 1. City of Georgia, U.S.A., on the S. shore of the riv. of same name, 110 m. S.S.E. of Augusta. It is built on a sandy plain, 40 ft. above the riv., and has broad streets, intersecting at right angles, ornamented with trees. It has numerous parks and squares, and sev. prominent buildings, chief amongst them being the Rom. Catholic cathedral, city hall, custom house, academy of arts and sciences, etc. The trade is chiefly in cotton, turpentine, and lumber. S. ranking as the second cotton port in the U.S.A. The industries include sugar and cotton-seed oil refineries, machine shops, and fertiliser factories. Fishing is carried out on a commercial scale. Pop. 96,000. 2. Riv. between Georgia and S. Carolina, formed by the Tugatoe and Kiowee Rs. Its course of 150 m. is in a general south-easterly direction, and it flows into Tybee Sound, 18 m. below S. It is navigable for steamers to Augusta (230 m.).

Savanna-la-Mar, prin. tn. of Westmoreland, Jamaica, 128 m. from Kingston. It is the shipping port of a prosperous sugar-growing dist. which also produces coffee and ginger. The par. church, built in 1903-4, occupies the site of one erected in 1799. Pop. 4000. See M. G. Lewis ('Monk' Lewis), *Journal of a West India Proprietor*, 1834.

Save, riv. of Yugoslavia, trib. of the R. Danube, about 500 m. long. It rises in N. Carniola and flows S.E. into the Danube at Belgrade. In ant. times the S. was one of the prin. trade routes between the W., central Europe, and the Euxine. It saw heavy fighting in the First World War.

Savelli, Cencio, see **HONORIUS** (popes), **Honorius III**.

Savelli, Giacomo, see **HONORIUS** (popes), **Honorius IV**.

Savernake Forest, large area of woodland, mostly of beech-trees, lying about 3 m. to the S.E. of Marlborough, Wiltshire, Eng. It covers 4000 ac. and abounds in deer and game. In 1938 it was taken over by the Forestry Commission for preservation and development.

Saverne (formerly **Zabern**), tn. and canal port of Lower Alsace, France. In the dept. of Bas-Rhin, on the Rhine-Marne canal

and the R. Zorn, 20 m. N.W. of Strasburg; it manufactures tools, woollen cloth, and hosiery. The tn. was famous for the 'Zabern affair,' 1913-14. The tn., when still in Ger. hands, was the scene of the harshness and most aggressive conduct of the Ger. garrison towards the civilian pop. This treatment culminated in the sabre-slashing of a lame cobbler by a Prussian officer. Pop. 8100. See C. D. Haezer, *Alsace-Lorraine under German Rule*, 1917.

Savigliano, tn. in the prov. of Cuneo, Italy, 8½ m. E. of Saluzzo. Its ant. walls were demolished in 1707 but traces still remain. It has large railway workshops. Pop. (comm.) 18,900.

Savigny, Friedrich Karl von (1779-1861), Ger. jurist, b. at Frankfort-on-the-Main, shared with Hugo and Naubold the honour of having founded the 'historical' school of jurisprudence. He was descended from a Calvinist family of Metz which had had to leave that tn. and seek refuge in Germany. His father, a diplomat and writer of distinction occupying an official position in Frankfort, died when S. was only thirteen years of age, but interested friends took in hand the boy's education. Having completed his education in classics at Wetzlar, he went to Marburg for law studies under Weis, whose speculations as the declared opponent of the traditional school of Wolff and Thomasius exercised great influence over him. In 1800 S. gained his doctorate with his thesis *De Concursu delictorum formalium*, which became famous; and three years later pub. his *Theory of Possession*, a classic vindication of the soundness of Rom. juristic conceptions of property, and a work which shows immense learning, especially for a man of twenty-four. In 1808 he was called to the chair of Rom. law. In 1810 he occupied a similar position in Berlin, which he was destined to hold for twenty-two years.

He was also made a member of the Prussian Council of State, his liberal yet profound opinions being of great service to the national cause. In 1842 he was appointed minister of justice, showing in his seven years of office most marked ability; but when the revolution of 1848 spread from France into Germany he resigned, preferring to devote his remaining years of activity to the revision of his works. These include, besides those mentioned, *History of Roman Law during the Middle Ages* (1815-31) and *System of Modern Roman Law* (1840-49). With Eichhorn and Goeschen he founded the *Journal of Historical Jurisprudence* (Berlin), 1815-47. The text of Prof. Holland's *Jurisprudence* contains numerous useful citations from his works. See L. A. Warnkönig, *Analysis of Savigny on the Law of Possession*, 1839, and M. Gutzwiller, *Der Einfluss Savignys auf die Entwicklung des internationalen Privatrechts*, 1923.

Savile, George, see **HALIFAX**, MARQUESS OF.

Savile Club. Founded, as the New Club, an offshoot of the Eclectics, at Spring Gardens in 1868. Objects included the mixture of men of different professions and opinions; early evening meetings and

table-d'hôte breakfasts and dinners, 'for purposes of conversation.' It moved to 15 Saville Row in 1871 (the name being changed to Savile), to 107 Piccadilly in 1882, and thence to 69 Brook Street in 1927 (the tn. house of Lord Harcourt). The club to-day is residential, social, non-political, predominantly conversational. It retains a membership of diverse professions. The process of election remains not by ballot but by discussion in committee.

Saville Theatre, in Shaftesbury Avenue, London, was opened by Jack Waller on Oct. 8, 1931, with *For the Love of Mike*, and became noted for comedies and revues, Leslie Henson being prominent there. Other productions include *He Wanted Adventure*, *Jill Darling*, *Genera*, *Junior Miss*, and *Here Come the Boys*.

Savin, or *Juniperus sabina*, small tree or bush with scale-like leaves and light green fruit. It is sometimes cultivated for the tops, which are used as an irritant and emmenagogue.

Savings, see MONEY, *Savings in Relation to Employment*; NATIONAL SAVINGS CERTIFICATES; PENNY BANKS; SAVINGS BANKS.

Savings Banks. These are banks estab. for the receipt of small sums deposited by the poorer classes, and for the accumulation of such sums at compound interest. Probably the first instance of such a bank in England was that estab. in Tottenham by a Miss Priscilla Wakefield in 1804, but the genesis of the Trustee S. B., as they are called to-day, was at Rutwell in Dumfriesshire, where the first savings bank was opened in 1810 by the Rev. Dr. Henry Duncan. After this date they so increased in popularity that by 1817 they had become the subject of legislative enactment. In order to encourage thrift and to promote the growth of S. B. both in England and Ireland, two Acts of 1817 prohibited trustees and managers of S. B. from receiving any profit therefrom, and required them to enrol the rules of their institutions at the sessions. A fund was estab. in London for the reduction of the national debt, entitled 'The Fund for the Banks for Savings,' and trustees of S. B. were bound to transmit the amount of all deposits made with them when the sum amounted to £50 or more, receiving in exchange debentures carrying interest at 4½ 11s. 3d. per cent per annum. An Act of 1824 restricted the deposits to £50 in the first year, and £30 in each subsequent year of any individual account, and prohibited any further interest when the whole deposit should reach £200, exclusive of interest. By the combined operation of the Consolidating Act of 1828 and the Savings Bank Act of 1844, deposits must be invested in the Banks of England and Ireland in the names of the Commissioners for the Reduction of the National Debt, such investment giving depositors the added benefit of the gov. security; deposits were to bear interest at the reduced rate of 4½ 5s., the depositor to receive of this 23 0s. 10d., the difference to be retained by the trustees for expenses. On Nov. 20, 1844, there were 577 S. B. in the United Kingdom, the deposits being

£29,504,861, and the number of depositors 1,012,047. On Nov. 20, 1848, there were 582 S. B. (including forty in Scotland and sixty-one in Ireland), the deposits amounting to £27,809,428, and the depositors 1,044,927. The periodical reductions in the rate of interest allowed by the commissioners (in 1817 it was 3d. per cent per diem; 1828, 2½; 1844, 4½ 5s. per annum; 1880, 4½; and in 1888 only 4½ 15s. per cent) were due to the fact that the stocks to which the commissioners were restricted rose in price in the Victorian era. Contrary to the hopes of those who advocated state aid, it was found that such aid involved a direct cost to the taxpayer, and the state soon found that the custody of S. B. funds was not directly profitable. The result of the payment of interest out of capital, and of the obligation to invest in consols and other home gov. stocks, was an accumulated loss of some millions which was only finally wiped out in 1881 by the creation of an annuity of £83,673 which expired in 1917. Since 1876 deficiencies in income have always been made good annually. There has, however, been no deficiency since 1908; in fact during the period 1876 to 1913 there has been a substantial surplus accruing annually to the Exchequer, the net total of which amounted to over £11,000,000 for the period. The S. B. system in England underwent a great change in 1861 by the estab. of the Post Office Savings Bank and the acceptance by the State of direct responsibility to the citizen for the safe custody of his savings. There are thus in existence two classes of savings bank, Trustee and Post Office S. B. The old class of savings bank managed by local bodies of trustees who took all the responsibilities of accepting and investing deposits, while the banks took (in some cases) the further risk of depreciation of securities or threw it upon the depositors themselves, has now disappeared; though analogous cases were to be found in the U.S.A. in comparatively recent years. The system by which the Bank of England became the central authority and the gov. relieved trustees of all direct responsibility was apparently the outcome of a pamphlet pub. by Joseph Hume, a Scottish M.P., in 1816; and that system was the basis of the present relationship between the State and the trustee-savings bank. State aid is thus summarised by Watt: (1) Gov. has become the bankers of the S. B., relieving the trustees of all anxiety as to the safety of their investments and charging all the expenses incurred by the commissioners upon the revenue of the country. (2) The State provides the S. B. with legal advice at nominal cost as to the validity of their rules, and has estab. a tribunal whose award is final in all disputes relative to deposits. (3) The State is the depositor's stockbroker, and the S. B. are exempt from certain taxes and imposts. Trustee S. B. are directed by local voluntary trustees and managers, whose duties are set out in Acts of Parliament, and in rules certified by the Registrar of Friendly Societies. They are subject to gov. supervision, and are

also inspected on behalf of the Trustee S. B. Inspection Committee, a statutory body which submits an ann. report to Parliament.

Every savings bank officer is bound by statute to give security against fraud, and depositors and trustees are further protected by audit and periodic inspection of S. B. books. The Statutory Regulations (*Post Office Savings Bank Report*, 1900, No. 76) provide for the indemnification of trustees for all acts done in accordance with the Savings Bank Acts, though, of course, such indemnity does not prevent a claimant from recovering any sum lawfully due to him from the person to whom payment has been wrongly made. The liability of trustees and managers is restricted to personal responsibility for funds received but not paid over, and to such specific cases of maladministration as neglect to take security from officers.

The limits on deposits themselves place no check on savings, for the stock held for a depositor need only be transferred in his name into the Bank of England books, and, if his deposit account be kept within the statutory limits he can go on saving without hindrance. But the extended limit of the cash deposits is a necessity due to the cost of each individual transaction (more than half of the deposit transactions in the post office are less than £1). In 1919 there were 5,500,000 active accounts in the Trustee S. B., whose number of offices now exceeds 1000. The total assets of the banks amounted to £899,751,000, these (1915) having trebled since 1938. This figure included £799,150,000 in the ordinary and special investment depts., £82,594,000 stocks and bonds held for depositors, and £17,977,000 being the accumulated surplus of the individual Trustee S. B. in the whole country. Any sums from 1s. to £500 may be deposited, and interest is allowed at 2½ per cent per annum. The depositor may have more than one account. There is now a limit of £2000 in the aggregate which may be deposited, and not more than £500 may be deposited in any one year (commencing Nov. 21).

The *Post Office Savings Bank*, which is the state savings bank of Britain, was estab. in 1861 to provide 'additional facilities for depositing small savings at interest with the security of the Government for due repayment thereof.' The main provisions of the *Post Office Savings Banks Act of 1861*, which is still the legal basis of the bank, were as follows: Officers of the postmaster-general were authorised to receive deposits for transmission to the prin. office and to make repayments in whole or in part not later than ten days after demand. The rate of interest was fixed at 2½ per cent per annum. The postmaster-general was directed to pay over monies received by him to the National Debt Commissioners for investment in securities expressly guaranteed by Parliament. Business commenced in Sept. 1861 at some 300 post offices; by 1870 the number had grown to over 4000 and by 1949 there were over 18,500 post offices, covering

every tn. and nearly every vil. in the country, where savings bank business could be transacted. During the first fifteen months, from Sept. 1861, 639,000 deposits amounting to more than £2,000,000 were received and the figures steadily increased from 2,136,000 deposits of £5,995,000 in 1870 to the figure of 43,000,000 deposits totalling £385,000,000 in 1948. Similar steady progress marked the number of accounts remaining open at the end of each year; the figure at the end of 1862 was 178,000, which had risen in 1870 to nearly 1,200,000. The number of active accounts at the present time is about 23,000,000. The total amount due to depositors in 1870 had reached a figure slightly in excess of £15,000,000; the amount at the end of June 1949 stood at approximately £1,968,948,000. A person of any age may become a depositor, and in doing so he is supplied with a bank book in which the transactions are recorded. A depositor not less than seven years old can make deposits and withdrawals in his own name, but in the case of a child of more tender years no withdrawal is permitted until the age of seven is reached. Wide facilities are offered for corporate savings by clubs and societies, and, in fact, deposits can be made by almost any organisation, provided the moneys are not derived from trading. Special facilities are also available for saving under *Post Office Savings Bank* auspices by members of H. M. forces.

Restrictions on the amount which may be deposited have always existed, except for a period from 1916 to 1923. Originally the ann. and total limits were £30 and £150 respectively; at present they are £500 and £2000. The original method of withdrawal was by notice and warrant, but although this method survives it has been supplemented by a facility for withdrawal on demand of sums up to £3 daily, without reference to head office. Sums up to £10 can be withdrawn by telegraph, and an application sent by post for a sum not exceeding £50 can be authorised by telegraph. Withdrawals like deposits may be made at any savings bank post office, irrespective of where the account was opened.

In the U.S.A. the S. B. were modelled upon those of Great Britain, and as far back as 1816 the first bank for looking after the savings of the poor was estab. in Boston. These mutual S. B. were founded and worked without profit by patriotic and public-spirited citizens whose object was to inculcate methods of thrift amongst the poor. They have grown and spread, being found now in seventeen states, but being especially strong in New England and the middle Atlantic states. Since 1910 the gov. has estab. a post office savings system. Accounts may be opened by the deposit of \$1 or more by persons over ten years of age. Interest at 2 per cent per annum is paid (except when the State specifies a lower rate on savings), and deposits are limited to \$2500. In 1948 there were 532 mutual S. B., as compared with 808 in 1930 and 551 in 1910. In addition, thrift accounts are received by most

commercial banks. Between 1930 and 1940 total savings deposits declined from \$28,700,000,000 to \$27,700,000,000, but by 1945 they had risen to \$18,500,000,000 and by 1948 to \$57,250,000,000. Of the 1948 total, the mutual S. B. held \$17,746,000,000. At the close of 1948, the mutual S. B. held 27 per cent of their assets in mortgages, 56 per cent in U.S. Gov. securities, 10 per cent in other securities, and 4 per cent in cash; in 1932, at the depth of the great depression, the corresponding figures were 54 per cent, 7 per cent, 30 per cent, and 4 per cent. The changes reflect the earlier effect of depression upon real estate and the later impact of financing the Second World War. See also PENNY BANKS.

See H. O. Horne, *A History of Savings Banks*, 1947; Watt, *The Law of Savings Banks*, 1948; Trustee Savings Banks Association, *Trustee Savings Banks Year Book*.

Savings Certificates, National or War, see NATIONAL SAVINGS CERTIFICATES.

Savoie, François Eugène, Prince de, see EUGÈNE.

Savoie, dept. of E. France (cap. Chambéry) on the It. border, formed (1860) out of the old duchy of Savoy. It is generally mountainous; the chief riv. is the Isère. There are mineral springs at Aix-les-Bains and elsewhere. Grain, wine, fruits, cheese, etc., are produced. Area 2388 sq. m. Pop. 236,000.

Savoie, Haute-, dept. of S.E. France, formed from Savoy, and divided into four arrons.: Annecy, Bonneville, Thonon, and St. Julien. Area 1774 sq. m. The surface is exceedingly mountainous, the dept. containing Mont Blanc (15,780 ft.). The chief rvs. are the Arve, Dranse, Ussel, and Fier, tribs. of the Rhone. There is much forest land, cereals and hardy root crops are grown, and on the lower slopes orchard fruits, vines, and tobacco flourish. The most fertile region is the N. and N.W., where the elevation is under 1640 ft. There is excellent pasture. Manufs. are limited, but include textiles and watches and clocks. Cap. Annecy. Pop. 270,400.

Savona, seaport of S. prov., N. Italy, on the Riviera di Ponente (Mediterranean coast), 25 m. W.S.W. of Genoa. It has a seventeenth-century cathedral, and is a bishop's see. It has iron and steel foundries, railway shops, and ship-building yards. Machinery, firearms, chemicals, pottery, and cloth are manufactured. A funicular railway for carrying coal has been constructed from S. to San Giuseppe. In the battles of 1945 the church of Santa Croce and the Cappella Sistina sustained damage. Pop. (prov.) 219,000, (comm.) 69,200.

Savonarola, Girolamo (1452-98), It. preacher and reformer, b. at Ferrara. He received a good education at the court of the D'Estes, but in 1475 he became weary of the corruption around him, and retired to a Dominican monastery at Bologna. He entered the order of the Friars Preachers, and for fifteen years remained quietly carrying out the duties of his vocation. In the early eighties he was

sent to the monastery of San Marco at Florence.

In 1490 he preached a course of sermons at the monastery. Crowds came to listen to his enthusiastic addresses, and in the next year he preached at the cathedral of Santa Maria del Fiore. His discourses were denunciatory and prophetic. He spoke with vigour against the profligacy and corruption of the city, and did not hesitate to condemn the Medici themselves. He foretold a foreign invasion, which would bring bloodshed and desolation over the land. A few years later his prophecy was fulfilled by the invasion of Charles VIII. of France. Even before this, S. had steadily inculcated democratic doctrines, and recommended a return to the former popular system of government. Lorenzo was now dead, and all was in confusion. Round S. there gathered a democratic party called the *Piagnoni* or 'weepers,' who bewailed the sins for which these evils had come upon the city. Opposed to them were the *Arrabbiati* or 'outraged,' the aristocratic party. For a time the *Piagnoni* had the upper hand, and a general council was formed to govern the city. Meanwhile the *Arrabbiati* denounced S. as an impostor, and appealed to Rome. Pope Alexander VI., who also had suffered from the friar's denunciations, summoned him to Rome and, after he had thrice disregarded this summons, excommunicated him.

By 1495 the Florentines had begun to tire of S.'s lofty ideals. He was accused of heresy and cast into prison. Under the tortures which followed he broke down, but always withdrew his confessions when released from the rack. On May 31, 1498, he was hanged with two other Dominicans, and the bodies of all three were afterwards burnt. He has been regarded by some as a herald of the Reformation. His writings were numerous. For a list of these and for a full bibliography see A. Gherardi, *Nuovi documenti e studi*, 1888. An Eng. trans. of his life by P. Villari was pub. in 1888. See also monographs by J. L. Pastor, 1898; J. L. O'Neill, 1898; H. Lucas, 1899; E. L. S. Horsburgh, 1901; P. Misciatelli (Eng. trans.), 1930; and R. Roeder, 1936.

Savory, or *Satureia*, genus of herbs (family Labiate). Summer S. (*S. hortensis*) is an ann. used for flavouring and seasoning. Winter S. (*S. montana*), which is similarly used, is a perennial and evergreen.

Savoy, Duchy of, formerly a div. of the kingdom of Sardinia, was ceded to France by treaty in 1860. Under Sardinia it was divided into the provs. of Chambéry, Upper Savoy, Maurienne, Tarentaise, Annecy, Faucigny, and Chablais, but it now forms the depts. of Savoie (cap. Chambéry), covering an area of 2388 sq. m., and Haute-Savoie (cap. Annecy), covering an area of 1774 sq. m. It is one of the most mountainous dists. of Europe, and the climate is cold. Aix-les-Bains, much frequented for its mineral springs, is one of the best-known places in the region. See also next entry.

Savoy, House of. The story of this

house is one of the most difficult and tangled in hist., owing to the position as 'Gatokeeper of the Alps' occupied by S. The founder of the house was Humbert of the White Hand (d. 1048), a descendant of Boson of Provence, who in 1027 obtained from Rudolf III. of Arles the cos. of Savoy and Maurienne and from the emperor Conrad the Salic Chablais and the Lower Valais, all ters. lying on the N.W. slopes of the Alps. By about 1190 the counts of Savoy and Maurienne possessed wide dominions on the borders of Italy and Burgundy, and during the succeeding centuries they continued to make extensive conquests in both countries. Humbert III.'s son, Thomas (1177-1233), received from the Ger. emperor Henry VI. ter. in Vaud and Valais, with the title of Imperial vicar in Lombardy and Piedmont. The possessions of the house were greatly increased by Peter of S., earl of Richmond (1203-68), 'the little Charlemagne' and brother of Boniface of S. (q.v.). In 1401 the Genevois was purchased by Amadeus VIII who was created the first duke of S. by Sigismund, emperor of Germany, in 1417 (see AMADEUS, *Amadeus VIII.*). In his reign the ters. of the house covered a vast stretch of W. central Europe. From this time, however, its power and extent gradually diminished. S. was conquered by France in the war of 1536-44, but was restored by Francis I. through the treaty of Crespy (1545), but the terms were not carried out. Victor Amadeus I. (1587-1637), siding first with France and then with Spain, concluded pence in 1631 and was succeeded by his son Charles Emmanuel II. (1631-75), who bore the brunt of many years of conflict with Spain. The treaty of Utrecht (1713) confirmed Victor Amadeus II. (1666-1732) in the possession of the places granted on his joining Austria against France, including the long coveted Monferrato, and endowed him besides with the crown of Sicily; but in 1720 Charles VI. of Austria induced him to exchange the latter kingdom for Sardinia. On the outbreak of the Fr. revolution S. headed the coalition of It. princes against France, but ended by being annexed to France in 1792. By the congress of Vienna, however, S. was restored (1814) when Victor Emmanuel I. (1759-1824), who had retired to Sardinia, returned to Turin (1815). Thereafter the hist. of S. waned in importance and in 1860, in return for the assistance given by Napoleon III. to Italy, it was ceded to France. Its king, however, was more than compensated when, in 1870, he became king of a united Italy.

Savoy Palace. Savoy Chapel in the Strand, London, is now all that remains of the palace built in 1245 by Peter, earl of Savoy and Richmond, after whom is named the Savoy dist. of London, S. of the Strand. During Tudor times, after the palace had been burned during the insurrection under Wat Tyler, it was rebuilt as a hospital and almshouse, and served a variety of purposes until 1817, when it was demolished during the construction of the approach to Waterloo

Bridge. The chapel royal, in the Perpendicular style, was restored in 1864. The Savoy Hotel, opened in 1889, is partly on the site of the S. P. See W. J. Loftie, *Memorials of the Savoy*, 1878.

Savoy Theatre, at Savoy Hill, London, opened Oct. 10, 1881 with Gilbert and Sullivan's *Patience* under the management of F. R. D'Oyly Carte. The theatre was for long the home of the D'Oyly Carte opera company, and saw the production of all the Gilbert and Sullivan operettas. Between 1911 and 1914 the S. T. was the scene of many Shakespearian productions under J. E. Vedrenne and Granville Barker. The years between the First and Second World Wars saw the production of *Young Woodley* (1928), *Journey's End* (1929); and *Lady Precious Stream*. In more recent years the following have been among the S. T.'s most successful productions: *The Last of Mrs. Cheyne* (1944); *The First Gentleman* (1945); and *Life with Father* (1947).

Savu, is. of Indonesia. Its length is about 21 m. Tobacco, rice, and indigo are produced. Pop. 25,000.

Sawantwadi, state of India, merged in Bombay Prov., N. of Goa. The cap. is Wadi, or Wari, 30 m. N. of Panglin. Area of state 937 sq. m. Pop. (state) 252,000, (tn.) 10,000.

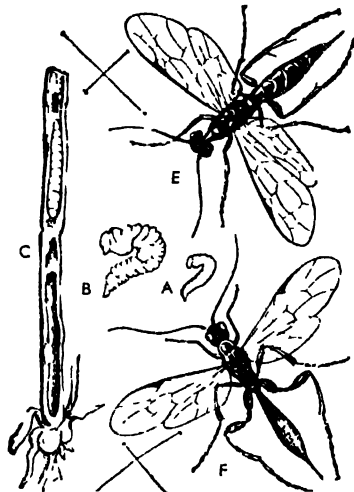
Sawatch, Saguache, Sierra Madre, or **National Range**, range of mts. in Colorado running parallel with Park Range. It is 80 m. long and contains sev. peaks over 14,000 ft. in height, including Harvard (14,375 ft.).

Sawdust. The utilisation of S. produced in various woodworking operations constitutes a difficult problem in many instances. The S. from seasoned timber is fairly dry and clean, and outlets can often be found when the mill is favourably situated. It forms a very satisfactory fuel, and S.-burning stoves with inclined grates, either stepped or plain, are used fairly extensively in America and Canada, and comparable types are available in Great Britain. S. has been used with a certain amount of success as an aggregate in pre-cast concrete units for building purposes. S. cement has fairly good insulating properties, but has the major disadvantage of a high initial shrinkage on drying. It is used for fire-lighters and briquettes (dry S. and shavings); gas production (shavings or mixture of S., dry); also for fish and bacon curing (S. mixed with shavings). S. is also used as a filler in some gypsum products, including plasterboard, and considerable attention has been paid in recent years to the production of wallboards from S. and wood chips. Dry S. (sometimes in admixture with chips and shavings) is used for the purpose of heat insulation in floor and partition walls, cold stores, ice chests, etc., and for the lagging of hot-water tanks and pipes. The S. produced in the conversion of green timber presents most difficulties, and apart from a small consumption in floor sweeping and the protection of freshly laid concrete, there are few uses to which it can be applied.

Saw-fish (*Pristis*), genus of fish of the

Ray sub-order, distinguished by the prolongation of the rostrum of the skull with its double saw of lateral teeth. They occur chiefly in tropical seas, where they attain considerable size, the 'saws' alone sometimes measuring 6 ft. in length. They are used to rip up the body of a large fish or whale.

Saw-flies (Tenthredinidae), family of hymenopterous insects. The hind body of the female is provided with an ovipositor, consisting of thin paired plates, the inner edge toothed to act as a saw, by means of which the female makes cuts in plant tissues and lays her eggs there.



SAW-FLIES

E, Corn saw-fly, Europe (female, $\times 3$). A, Outline of larva; B, larva (magnified). C, Larva in stem; F, leucocyon fly (magnified), whose grub feeds on the larva of the saw-fly.

The larvae of some species are concealed within swellings or galls in the tissues of the food plant. About 2000 species occur, particularly in temperate countries; many of them are the cause of much damage to farm and garden crops, e.g. *Nematus ribesii*, the gooseberry saw-fly.

Saws. Three types of S. in common use are the reciprocating saw, the circular saw, and the band-saw. Under the heading of reciprocating S. come the ordinary S. used by a carpenter, and the hack saw. The cross-cut saw is used for cutting across the grain of the wood, and has its teeth so arranged that the angle between the front of one tooth and the back of the next is inclined at 60° ; thus the teeth are easily sharpened with a triangular file. The face of the tooth is inclined backwards about 12° , and the teeth are bevelled alternately on the same side, the angle of bevel being about 45° , so that a sharp pointed tooth is

obtained. The ripping saw is used for cutting along the grain, and has teeth that include an angle of 60° between the front of one tooth and the back of the next, the front of the teeth being usually upright and filed square. Both of these S. are designed with tapering blades to limit their tendency to bend on the cutting stroke. Unless hollow ground the teeth are set to avoid their being choked with sawdust when the saw is in use. The hack saw is used for cutting metal, and consists of a frame with a hardened steel blade stretched across it. When used on power it is actuated by a connecting rod and a crank. Circular S. are usually made in the form of a circular disk, but may sometimes have a cylindrical or concave shape. The band-saw consists of a thin endless band of steel with teeth on one or both of its edges, so mounted that it is stretched tightly over the two pulleys when being driven on the machine. It is superior to the circular saw because of its greater speed of working, and also because the blade is thinner and wastes less wood.

Sax, Antoine Joseph, called also **Adolphe** (1811-94), the son of a Fr. musical instrument maker, b. at Dinant. S. devoted himself to the manufacture of clarinets. By applying new principles to the clarinet he invented the saxophone (*q.v.*) (1838) and the saxhorn (*q.v.*) (1843).

Saxe, Maurice, Comte de (1696-1750), marshal of France, b. at Goslar. He was the natural son of Augustus II., elector of Saxony, and Countess Aurora von Kongsmark. At the age of twelve he joined the army, and served under Prince Eugene at the sieges of Tournay and Mons and the battle of Malplaquet. He also took part in the siege of Stralsund in 1712 with his father, and in 1717 fought in the campaign against the Turks. In 1726 he was elected duke of Courland, and in 1731 served under Marshal Berwick, distinguishing himself at Philippsburg, for which he was made lieutenant-general. He commanded a div. in the Austrian Succession war, took Prague and Eger, and was promoted to be marshal of France. After this he became one of the first generals of his age. In 1745 he besieged Tournai and defeated the duke of Cumberland at Fontenoy, and in 1746 gained the victory of Raucoux, to be again successful at Lauffeld (1747) and at Maastricht (1748). He was the author of *Mes rêveries* (1757), a work on the art of war. See his *Letters and Memoirs* (1791); T. Carlyle's *Frederick the Great*, 1851-65, and lives by Saint-René Taillandier, 1865, and Carl von Weber, 1870. See also E. B. d'Auvergne, *The Prodigious Marshal*, 1930.

Saxe-Altenburg, one of the seven Thuringian states which in 1920 combined into one state, Thuringia, to the S. of Prussia in Germany, with an area of 512 sq. m. It consisted of two divs. separated from each other by a portion of Reuss: the E. or Altenburg, watered by the Pleisse, being a fertile region; the W. or Snaal-Eisenberg, through which the Saale flows, being hilly but rich in forests. The gov. was in the hands of a Diet, which was

adopted by the constitution of 1921. S.-A. lay in Thuringia, in the Russian occupation zone, after 1945. The chief tn. is Altenburg. Pop. 216,000, mostly Protestants. See THURINGIA.

Saxe-Coburg and Gotha, Alfred Ernest Albert, Duke of, see ALFRED ERNEST ALBERT.

Saxe-Coburg-Gotha was formerly a duchy of the Ger. empire, consisting of two prin. duchies, Coburg and Gotha, and sev. smaller detached states. In 1920 the Thuringian states of S.-C.-G. united with the other Thuringian states to form the Thuringian Free State. Coburg, with the adjoining portion of S.-C.-G., was merged with Bavaria. S.-C.-G. had a total area of 763 sq. m., of which about 217 were in Coburg and 516 in Gotha; Coburg was separated from Gotha by Saxe-Meiningen and part of Prussia. Coburg is an undulating fertile dist., reaching its highest point in the Sonnhöhe (1716 ft.), and watered by tribs. of the Main; Gotha stretches along the slopes of the Thuringian Forest, its highest point being the Grose Beerberg (3225 ft.). Anciently, Coburg was an hereditary duchy of the counts of Henneberg, but passed, by marriage, to the house of Saxony. In 1825 when the duchy of Gotha was partitioned, the principality of Gotha was added to Coburg, thus forming the duchy of S.-C.-G. The tn. and dist. of Coburg lay in Bavaria, in the U.S. zone of occupation, after 1945. The rest of S.-C.-G. lay in Thuringia, in the Russian zone. See THURINGIA.

Saxe-Meiningen, formerly a duchy of Germany, situated in the region of the Thuringian Forest, and consisting of sev. detached portions of ter., aggregating in area 953 sq. m., with a pop. of 278,000. In 1920 it joined with the other states of Thuringia to form the Thuringian Free State. The area is wealthy in minerals, especially coal, copper, salt, iron, slate, and cobalt. S.-M., after 1945, lay in Thuringia, in the Russian occupation zone. See THURINGIA.

Saxe-Weimar-Eisenach, former grand duchy of Germany, embracing the three divs. of Weimar, Eisenach, and Neustadt, besides twenty-four small enclaves in the neighbourhood of the Thuringian Forest. In 1920 it joined with the other Thuringian states to form the Thuringian Free State. Area, Weimar 500 sq. m., Eisenach 430 sq. m. Weimar occupies the central position, Neustadt and Eisenach the E. and W. portions respectively. The surface is hilly, rising to peaks of over 2000 ft. The Saale waters the Weimar div., and the Werra drains the Eisenach div. S.-W.-E., after 1945, lay in Thuringia, in the Russian occupation zone. Weimar, formerly cap. of the duchy, is now cap. of Thuringia. See THURINGIA.

Saxhorn, brass wind instrument with a cup-shaped mouthpiece invented by Adolph Sax (q.v.). It consists of a conical tube which widens out into the form of a bell at one end, and is furnished with three valves by means of which the compass is rendered chromatic. It produces the usual harmonic sounds and is made in

various keys. It is used in military bands and in small wind bands.

Saxitragaceæ, natural family of shrubs and herbaceous plants, most abundant in the colder climates. Important herbaceous genera are *Ribes* (currant and gooseberry) and *Saxifraga* (see below).

Saxifrage (*Saxifraga*), or Rockfoil, large genus of ann. and perennial plants with radical and cauline leaves, and cymes of white, yellow, purple, or red flowers. About a dozen species are Brit. *S. umbrosa*, London Pride, though common in gardens, is found wild only on mts. in the S.W. of Ireland. This and other species are grown as edgings. Many are of great value in the rock garden, and some are grown as pot plants.

Saxo Grammaticus, originally **Sakse** (b. c. 1110), Dan. chronicler and historian, born in Seeland (Sjælland) (contemporary with Snorri Sturluson). He became secretary to Absalon, the great archbishop of Roskilde, who encouraged him to begin his *Gesta Danorum* (i.e. *Historia Danica* (in Lat.) c. 1185, the work extending to sixteen known vols., comprising the most vital information now possessed on ancient Denmark and the first phase of the Middle Ages. Old customs, legal rulings, and auct. beliefs appear beside authenticated hist. He died in 1206, and posthumously enjoyed the distinction of being trans. 600 years later by Bishop N. F. S. Grundtvig (1783-1872) direct descendant of Archbishop Absalon. See Eng. trans. by O. Elton (books i.-ix.), 1894.

Saxon Duchies, Saxe-Weimar-Eisenach, Saxe-Meiningen, Saxe-Altenburg, and Saxe-Coburg-Gotha. See under name of each state and under THURINGIA.

Saxon Language, the terms S. and A.-S. are popularly used to designate the form of language introduced into Eng. by Germanic tribes who invaded this country in the fifth century. The principal of these tribes were the Saxons, the Angles, and the Jutes. All these tribes spoke closely allied dialects of a language, which can be called a 'pure' one, containing few foreign words. The general term of the invaders for the whole country which became their new homeland was *Englaland*, 'Land of the Angles,' and the language was called *Englisc*. Bede used the expression *Angli sive Saxoncs*, implying that both terms meant the same thing, but Alfred the Great, the founder of the western S. prose, the Abbot Ælfric, a western S. writer, and the first Eng. Christian king Ethelbert of Kent called their language *Englisc*. *Lingua Saxonica* or *Saxonice* is rarely used as a generic term, but it is more often employed in specific reference to the S. dialects. The term A.-S., coined in the seventeenth century, is rather misleading; it is sometimes used in opposition to 'continental S.' The term more commonly employed is O.E. (see under ENGLISH LANGUAGE and ENGLISH LITERATURE).

O.E. soon became split up into various dialects, which can be distinguished into three or four groups: the S. dialects, the Anglian dialects, divided into Northumbrian (the dialects of the Angles N. of the

Humber), and Mercian (the dialects of the Angles of the Midlands). There were probably also E. Anglian dialects, but we do not know anything of their early form. We have no written documents in O.E. of the first few hundred years. The earliest documentary knowledge of this language consists in some names of places and persons which appear in a few Lat. charters of the late seventh and the early eighth centuries. Of the S. dialects the most important by far is that of Wessex, or W. S., which became dominant for literary purposes during the reign of King Alfred (871-901), and maintained its supremacy until the close of the O.E. period. Another form of S. is known as S. Patol- (of the Blickling Homilies and the Harley Glosses). Kentish and the Anglian dialects are mainly known to us in charters, glossaries, glosses, or paraphrases of the Gospels and the Psalms. Therefore the study of literary O.E. is mainly based on W.S.

Like Ger., Lat., and Gk., and unlike modern Eng. W. S. was a highly inflected language. It retained the elaborate system of genders; its nouns were masculine, feminine, or neuter; and they had four case-forms in the singular and plural, together with corresponding ones of the dual number, which has disappeared in all modern Germanic languages except Icelandic. The adjectives agreed with the nouns, and were declined with them. In the conjugation of the verbs there were twice as many forms as in modern Eng.: as in Ger., there was a large number of verbs, called 'strong,' in which changes in tense were indicated by internal vowel change (some modern Eng. words still show the basic similarity of pattern, e.g. write, wrote, written). There existed a second larger group of verbs called 'weak,' which used a different method for forming tenses, a suffix, consisting in a syllable containing a dental consonant (-*de*, -*ode*, -*le*). The verb had a special infinitive form (-*ian*, -*an*, -*n*), and a past participle (prefix *ge-*).

See further under ENGLISH LANGUAGE; for S. literature see under ENGLISH LITERATURE.

Saxons, one element of a confederation of Germanic peoples who lived in the plains in the region of the Lower Elbe. The generic name is said to be derived from their national weapon, the *seax*, a short thrusting sword, in the same way that the Franks, the spearmen, took their name from the O.H. *franca*, javelin. The confederacy was a loose one, characterised by its maritime outlook and by its insistent S.W. spread in search of living space. Its migrations spread as far W. along the channel as Boulogne and the Bessin, and many of those folk who arrived in Britain (known as the Anglo-Saxons) had come indirectly from the Rhineland and the coast of Holland and Belgium, a *ter*, of the Sallian Franks. The migration to Britain took place, according to traditional belief, which is derived from Bede, in A.D. 449, and the evidence of archaeology and such reliable literary sources as are available suggest the years

about A.D. 450 as marking the end of piratical raids by the Saxons, and the beginning of their serious land-takings. The early chroniclers describe the tribal elements of the Angles, Saxons, and Jutes in their homeland, and try to relate them to the regions which they are thought to have settled in Britain. The standard authority, Bede, states that the tribes who came to Britain at the invitation of the Brit. chieftain Vortigern were from three powerful Germanic peoples, the Saxons, Angles, and Jutes. The Saxons came from what Bede called Old Saxony; the Angles from Angulus, a country lying between that of the Saxons and the Jutes; the people who settled in Kent, the Isle of Wight, and what is now S. Hampshire were descended from the Jutes; those in E-sex, Sussex, and Wessex came from the homeland of the Saxons; while from the homeland of the Angles came the E. Angles, Middle Angles, Mercians, and Northumbrians. This clear-cut course of the settlement is not completely proved by archaeology, but it is in the main correct. There was considerable admixture between the three main tribes before they reached Britain, perhaps even during the migration, and interchange and development still took place even when they reached their new home. There was also local development in those regions which were isolated culturally and geographically, and later evolved into kingdoms.

The evidence of the cemeteries establishes a wide settlement in E. England, stretching roughly from the Tees to the Thames, penetrating deeply into the Midlands and the Upper Thames, and in the S. from Kent to the N. of Hampshire and E. Wiltshire. In this settlement the Thames, Trent, and Ouse played important parts, but equally certain is the use of some Rom. roads, particularly in Leicestershire, Warwickshire, and Yorkshire. Probably the Icknield Way controlled the settlement of S.-central England, but there is no sound evidence to support the once widely accepted invasion by way of Southampton Water. Archaeological research now being undertaken (1949) in the Saxon settlement of Southampton may cause this view to be modified. By the end of the sixth century much of England was in A.-S. hands. Kent, E. Anglia, Wessex, Bernicia, Deira, and finally Mercia had all developed into separate kingdoms. By about 828 Egbert had become Bretwalda. He may not have been king of the Eng., but his consolidation of *ter*, and his purposeful rule made possible the tremendous undertakings of his grandson, Alfred, the greatest of Eng. kings. (See the works noted further below, and R. W. Chambers, *England before the Norman Conquest*, 1928; R. H. Hodgkin, *History of the Anglo-Saxons*, 1935; and Sir F. Stenton, *Anglo-Saxon England*, 1937. Each contains notes of the historical sources and assesses the value of the archaeological and other evidence.)

Anglo-Saxon Art and Architecture.—The period covered by A.-S. art is most conveniently reckoned from the rescript of

Honorius to Britain in A.D. 410 to A.D. 1000. It starts with the intermittent raids made on the coast of Britain by Germanic pirates up to about A.D. 450, and the longer period of serious land-taking, and continues with the real period of settlement and with the momentous effects of the conversion. A.-S. art as a whole is a long, continuous, and uneasy struggle between the elements of Teutonic barbaric art and those of the classical world as represented in the W. provs. of Rome; in addition it incorporated certain principles which were a legacy from the world of 'Celtic' Britain. The barbaric artist scorned the naturalism which was the foundation of classical aesthetic taste, while the artist who portrayed in classic tradition exactly that which he saw was never able to experiment with the symbols and abstract designs which formed the powerful repertory of a barbaric style. The legacy from prehistoric Britain may be seen especially in the enamelled escutcheons of the bronze hanging-bowls which were possibly intended for use as church lamps; the designs include triple running scrolls, and they represent a tradition out of which, in the late seventh century and after, was to come the brilliant metalwork and book illumination which demonstrate the finest qualities of Saxon artistic genius. The ultimate source of the Ger. barbarian art was W. Asia, and in their migrations the Goths acquired a skill in the use of schematic animal ornament and a taste for polychrome jewellery. These two factors had indirect but important parts in the development of A.-S. art.

For the pagan period it is necessary to rely almost entirely on the contents of cemeteries for an understanding of the art, though saga poems such as *Beowulf* may provide an interesting cultural background. There is much metalwork; the large series of plain bronze brooches of which many thousands have been recorded includes many of excellent though simple design; there are remarkable annular brooches of silver ornamented by tracing and decorated with niello; and the gold and silver jewels made in the Faversham dist. of Kent, with inlays of garnet and lapis lazuli, and decoration of interlaced gold filigree, are commentary enough on the skill of goldsmiths, though their precise chronology is uncertain. The famous ship-burial excavated at Sutton Hoo, Suffolk, in 1939, has provided the finest examples of the Saxon goldsmiths' art yet known. The art of hand pottery was practised widely, but the wares have no merit in their form or decoration. A simple ornament is stamped in units or incised by roughly drawn lines; a few biconeal pots bear corded ridges in addition. Fine glassware was imported into S.E. Britain from the Rhineland, but none was manufactured here.

The conversion of the Eng., which began with the arrival of the Augustinian missionaries in A.D. 597, and the return of an active Christianity to England from Ireland, were the most powerful influences in the development of A.-S. art. With the

encouragement and patronage of the Church, which did not hesitate to import foreign artists, there came a great renaissance, which was to prepare the way for a golden age of learning, when Britain was a calm oasis in the clamour of W. Europe. In particular it led to the new introduction of architecture, at once the greatest of the arts. This early Romanesque eccles. building is characterised by a rugged strength, but in its imperfections of design and execution it is a reflection of the troubled artistic spirit of the times. A group of missionary churches is centred upon Canterbury; while an It. origin must be sought for some of their features, they owe much to the genius of Theodore, archbishop of Canterbury, who was of Tarsus. In Northumbria, Wilfrid and Benedict Biscop were responsible for much eccles. building. The latter founded Wearmouth in 674 and Jarrow in 682, and the books and pictures which he brought back from his journeys to Rome must have served as an inspiration to native artists. Outstanding examples of the heavy Northumbrian style are the crypts of Wilfrid's ministers at Hexham, Northumberland, and Ripon, Yorkshire, while at Monkwearmouth is the porch of a church built about 675 by Benedict Biscop, with the aid of masons from Gaul. At Brixworth, Northamptonshire, is a church built about 670 by the monks of Peterborough. Church architecture of the later Saxon period may be seen at Ears Barton, Northamptonshire (which has been called the most noteworthy architectural monument of the Saxon period), at Barnack, near Stamford, and in very many par. churches of England. The characteristic features are pilaster-strips, splayed windows, baluster-shafts, and quoins of long-and-short work.

Church books of a high standard were produced by the Irish illuminators. The book of Durrow, written as early perhaps as 650, draws inspiration from the same source as the carpet-like panels of Romano-Brit. pavements. In Northumbria the book of Lindisfarne, a brilliant phantasy of line and colour, was written about 700 by Eadfrith, bishop of Lindisfarne. Its style has been described as Hiberno-Saxon, but the figures are often in an It. tradition, while the ornament has unmistakable Celtic traits. The book of Kells and the Ardagh chalice, both made about 800, represent the Irish attainment in painting and luxury metalwork.

The art of sculpture introduced by the foreign masons flourished. There was a great development in Northumbria in the seventh century, and later in Mercia the foreign-inspired traditions met an eastward flowing stream from Ireland, and from the union there arose a native art of supreme confidence. The standing crosses at Ruthwell, Bewcastle, Sandbach, Stapleford, and Aca's cross at Hexham are noteworthy. Other sculptures of merit are a decorative frieze at Bredon-on-the-Hill, a series of panels at Fletton, the flying angels at Bradford-on-Avon, and the rood at Breamore, while there are a number of interesting tombs and memorial slabs.

The later Saxons were skilled artists in bone and ivory (e.g. the Franks casket), in enamel work (e.g. the Alfred jewel), and in textiles (e.g. St. Cuthbert's stole). See also ENGLISH HISTORY; ENGLISH LANGUAGE AND LITERATURE; VIKING ART.



R. F. Jessup

SAXON SCULPTURED CROSS'S AT
SANDBACH, CHESHIRE

See G. Baldwin Brown, *The Arts in Early England*, vol. iii-vi, 1915-30; N. Åberg, *The Anglo-Saxons in England*, 1926; A. W. Clapham, *English Romanesque Architecture before the Conquest*, 1930 *Ordinance Survey Map of the Dark Ages in Britain*; S. Sheet, 1935, N. Sheet, 1938; E. T. Leeds, *Early Anglo-Saxon Art and Archaeology*, 1936; T. D. Kendrick, *Anglo-Saxon Art*, 1938, and *Late Anglo-Saxon and Viking Art*, 1949; and R. F. Jessup, *Anglo-Saxon Jewellery*, 1950.

Saxon Switzerland, mountainous region of Saxony (q.v.) to the N.W. of the mts. of Upper Lusatia. It is divided from the Erzgebirge by the Elbe, and extends along both banks of the riv.

Saxony (Ger. *Sachsen*), sixth in area and third in pop. and importance of the pre-1939 federated Ger. states, bounded on the N. by Brandenburg and Silesia, and S. by Czechoslovakia. Area 5786 sq. m. Pop. (1939) 5,207,000. The state is like a right-angled triangle, with the right angle in the N.W., and the longer side lying along the foot of the Erzgebirge range, which sends its spurs over the S. half of the country, giving to that portion a somewhat mountainous character, while the N. half remains a flat or undulating

plain. The whole country, with the exception of a small portion in the extreme E., which belongs to the Oder basin and is watered by the Neisse, is drained by the Elbe (which is wholly navigable in Saxony) and its tribs. From the point where the Elbe bursts through the Erzgebirge chain to within about 8 m. of Dresden, it traverses a dist. rich in picturesque scenery. This dist., which averages about 24 m. long by 23 m. broad, is an elevated plateau of coarse, crumbling sandstone, and has many striking features. The most remarkable of its peaks are the Königstein (864 ft.), the Lilienstein (1254 ft.), and the Bastel (600 ft.).

The climate is healthy, and on the whole temperate, though occasionally severe in the S.W. dists. Of the whole surface, more than one-half is arable, nearly one-third is forest, about one-ninth meadow, while the rest is occupied by gardens and vineyards, coarse pasture and waste land, or quarries and mines. The agric. products are wheat, rye, barley, oats, potatoes, hay, and all kinds of fruits suited to the climate. The forests, the largest of which are in the S.W. corner of Zwickau and along the N. slopes of the Erzgebirge, supply timber of excellent quality. Cattle are reared in the mountainous dists. of the S.W., and the wool occupied, before the Second World War, a high position in the markets of the world. The mineral wealth includes silver, tin, iron, cobalt, bismuth, zinc, lead, nickel, arsenic, antimony, and other metals, besides coal, marble, porcelain-earth, vitriol, and various gems. The main mining centre is Freiberg. In proportion to its area, S. was the busiest industrial state in Germany, rivalled only by the leading industrial provs. of Prussia. The prin. industries for which S. is noted are machinery, cottons, woisted yarns, soft wool tissues, carriages, furs, clothing, jute, furniture, stuffs, hosiery, gloves, laces, embroidery, paper, wood and straw pulp, bottle glass, musical instruments, sweets, cigars, and porcelain. The majority of the inhab. are Lutherans. Saxony has many fine educational establs., and the univ. of Leipzig is one of the largest in Germany, being attended by over 6000 students. Formerly a kingdom, S. was proclaimed a republic in 1918, and the last constitution was dated Oct. 26, 1920. Prior to the Nazi regime S. had a diet of ninety-six members. In the Reichsrat S. was represented by seven members. At Dresden was the Oberlandesgericht (court of appeal) for S., while at Leipzig was the Reichsgericht, the supreme court of Germany. The city was largely destroyed in the Second World War. Dresden (pop. 642,000) is the cap. The other chief tns. are Leipzig (716,000), Chemnitz, the one-time Manchester of Saxony (351,000), Plauen (87,000), Zwickau, Meissen, Zittau, Freital, and Freiberg. Wittenberg, chief tn. of the prov. of 'Upper Saxony' (a prov. of Prussia since 1815), was 'the cradle of the Reformation,' and contains the tombs of Luther and

Melanchthon and the castle church upon the door of which Luther nailed his theses.

History.—After the final conquest of the Saxons by Charlemagne, they became one of the components of the Ger. Empire; but their country by no means coincided with what is now known as Saxony. It included most of the country between the Elbe, the Harz Mts., the Rhine, and Friesland; and, in 850, was erected into a dukedom, with Lubeck for its cap., and ruled by hereditary princes. Ludolf, the first duke, is said to have been the great-grandson of the Saxon leader Wittekind. His grandson Duke Henry (876-936), surnamed 'the Fowler,' obtained the throne in 919, and commenced the Saxon line of Ger. sovereigns, which ended in 1024. Otto I. handed over the great duchy of Saxony to Hermann Billung in 960, on condition of military service, and this family held it till 1106. In the middle of the eleventh century, a duchy of 'Saxony of the Weser' was also founded; but both of these came (1113) to Lothair of Supplinburg, who was also invested (1106) with the great duchy of Saxony, which was now more extensive than ever, stretching from the Unstrut, in Gotha, to the Elder, and from the Rhine to Pomerania. After Lothair's accession to the imperial throne in 1125, he handed over the duchy (1127) to his son-in-law, Henry the Proud, the Guelphic duke of Bavaria, who was thus the ruler of more than half Germany; but under his son, Henry the Lion (q.v.), it was wrested (1180) from the house of Guelph. In 1260 the diminished S. was permanently divided into two portions, Saxe-Lauenburg and Saxe-Wittenberg, to the latter of which the electoral dignity remained, and to which, on subsequent dispute between the two branches, it was confirmed by the celebrated Golden Bull (1356).

The line became extinct in 1422 with Duke Albert III., and the duchy then passed to Frederick the Warlike in 1423. His possessions consisted of Thuringia, the pre-1939 free-state of S., and Prussian S., i.e. the whole of Upper S. with the exception of Anhalt. The Saxon elector was now one of the most powerful princes of Germany; but during the reign of the elector Frederick the Mild (1428-64), whose brother William had obtained Thuringia, a civil war broke out, and was carried on for years. Ernest (1464-86) and Albert (1464-1500), the sons of Frederick, in accordance with the will of their father, reigned conjointly over the hereditary domains of the family till the death of their uncle (1485), when Ernest obtained Thuringia, and Albert, Meissen, while Osterland was equally divided between them. Ernest, the founder of the Ernestine, which was also the elder or electoral, line, was succeeded by his son, Frederick the Wise (1486-1525), who favoured the Reformation, and firmly supported and protected Luther. Albert was the founder of the younger, ducal, or Albertine line, of whom the most celebrated was Maurice (1541-47). After the rout of the Protestants at Mühlberg, Maurice received the electoral title (1547-

1553), and the greater portion of the estates of his vanquished cousin. His brother, Augustus I. (1553-86), considerably increased his territory by purchase and otherwise, and restored Altonburg to the Ernestine line. John George I. (1611-56), allied himself with Gustavus Adolphus (1631), and took part in the Thirty Years war. The reign of Frederick Augustus I. (1694-1733) well-nigh ruined the hitherto prosperous electorate. Frederick Augustus II. (1733-63) took part in the war of the Austrian Succession and the Seven Years war. In the reign of King Frederick Augustus I. (1763-1827) agric., manufactur., and industrial enterprise progressed rapidly. He sided with the Fr. between the battle of Lützen (May 2, 1813) and that of Leipzig (Oct. 16-19, 1813). For his support of Napoleon he was deprived of the greater portion of Saxony, which was handed over to Prussia, but he retained the title of king, which had been conferred upon him in 1806. The rest of his reign was occupied with internal reforms. Anthony (1827-36) reformed the entire legislation of the country, and granted a liberal constitution, and the state's representatives first assembled, Jan. 27, 1833. S. shared in the humiliation of Austria at Sadowa in 1866, thereafter becoming a member of the new Ger. Empire in 1871, having previously come under Prussian military control as a member of the N. Ger. Confederation. At the end of the First World War, S. joined in the revolutionary unrest in which Germany was plunged. S. had always been a labour state with a complicated industrial organisation, and the labour principles of the people had never been extinguished by the rule of the Albertines. In Nov. 1918, a revolution took place, the Liberal Gov. then in power resigned, and King Frederick Augustus abdicated (Nov. 13). The republic was proclaimed on Nov. 9, 1918, and its constitution dated from Oct. 26, 1920. In 1923 there were riots among unemployed in Dresden, Leipzig, and other industrial towns. Food was scarce, and Bolshevik propaganda was not lacking, and shortly afterwards (in Oct.) the Communists got the upper hand, setting up in coalition with the more extreme Socialists the Republican Proletariat Gov. of S. Of this gov. Dr. Zeigner was Premier, and the communists Doetscher and Heckert were the ministers of finance and trade respectively. After some fighting the Central Gov. of the Reich appointed Dr. Heintze, the Reich minister of justice, as civil commissioner for S. With the aid of the military he occupied the Diet, and Dr. Zeigner's gov. resigned. Order was estab. by Nov. 6, and the republican regime continued without further interruption until 1933, when Hitler abolished the Diet.

After the Second World War, S. was included in the Soviet zone of occupation, together with the former Prussian prov. of S. (see next article). In the Second World War, Dresden, Leipzig, and Chemnitz suffered severely from allied bombers. Pop. (1946) 5,599,800. See C. W. Previtte

Orton, *Early History of Saxony, 1000-1233*, 1912; F. de Filippi, *Relations of the House of Saxony with the Court of England* (thirteenth to nineteenth centuries), 1918; L. Halphen, *Etude critique sur l'histoire de Charlemagne*, 1921; F. Teutsch, *Die Siebenbürger Sachsen (1141-)*, 1924.

Saxony, former prov. of Prussia, bounded on the E. and N.E. by the prov. of Brandenburg. Area 9752 sq. m. Pop. (1939) 3,300,000. The W. dists. are occupied by the Harz Mts., and the peak of the Brocken (3747 ft. high) is the chief elevation. The greater portion of the surface, however, is flat, and slopes toward the N., in which direction flow the prin. riva., the Elbe, with its tribs. the Saale and Mulde. The climate is mild and healthy, and the soil is fertile and well cultivated. Agriculture is extensively carried on, the prin. crops being cereals, potatoes, and hay. The Golden Aue, in the S.W., is especially fertile. Its prewar manufs. were machinery, cotton, oil, beer, small arms, etc. The cap. is Magdeburg (pop. 307,000). After the Second World War the state of Prussia was abolished and the prov. of S. was assigned to the Soviet zone of occupied Ger. in Germany. Area (with Anhalt) 11,155 sq. m. Pop. in 1946 (with Anhalt) 4,363,900.

Saxony, Lower (Land Niedersachsen), one of the three states of the Brit. zone of occupied Germany, formed in 1946 by the union of the states of Hanover, Brunswick, and Oldenburg, and the small duchy of Schaumburg-Lippe. It has an area of 18,528 sq. m. and a pop. of 6,912,000. It is half agric. and half industrial and (in 1947) was the only state in the Brit. zone which produced food beyond its own requirements. Its only large cities are Hanover, Brunswick, Osnabruck, and Oldenburg. Its industrial belt, stretching from Oldenburg in the W. to Helmstedt, on the Russian zonal frontier, in the E., contains about a third of the whole industry of the Brit. zone.

Saxophone, brass musical instrument invented by Adolphe Sax (q.v.) and patented by him in 1846. It consists of a conical tube bent back a little at the top, with a mouthpiece resembling that of the clarinet. The S. has twenty lateral orifices covered by keys, and manipulated with the first three fingers of each hand. The instrument is used in brass bands on account of the fullness of its tone and has achieved prominence in dance bands, where it is played with a specially adapted technique.

Saxton, Christopher (fl. 1570-96), Eng. cartographer, b. at Leeds and educated at Cambridge. He was attached to the household of Thomas Seckford, master of requests and of the court of wards, at whose expense he undertook to survey and draw careful maps of every co. in England and Wales. These maps were made during 1574-79 and issued with a dedication to Queen Elizabeth. It does not seem that S. engraved any of these maps himself, but they were engraved from his drawings by Augustine Ryther

and others. Complete copies of his maps have long been very scarce.

Say, Jean Baptiste (1767-1832), Fr. political economist, b. at Lyons. He was intended for a business career and was sent to England as a clerk. Returning to France, he was under K. Clavière in an insurance office, and it was whilst there that he first read Smith's *Wealth of Nations*, which led to his devoting himself to the study of economics. His *Traité d'économie politique* appeared in 1803, and in 1814 the Fr. Gov. sent him to study the economic condition of Great Britain, which resulted in his *De l'Angleterre et des Anglais* (1815). In 1828-30 he pub. *Cours complet d'économie politique pratique*. See study by A. Llesce, 1901.

Say, Jean Baptiste Léon (1826-96), Fr. politician, son of Horace Emile S. (1794-1860), and grandson of Jean Baptiste (q.v.), b. in Paris. Following the traditions of his family he devoted himself to political economy. He was for many years editor of the *Journal des Débats*. In June 1871 he became prefect of the Seine, and in Oct. came to London to return thanks for the relief of Paris after the siege. Finance minister in the Thiers, Buffet, Dufaure Jules Simon, and Waddington Cabinets, he wrote many works on financial and economical questions. See studies by G. Michel, 1899, and G. Picot, 1901.

Say and Sele, Barony of. Sir Geoffrey de S. (d. 1322), descendant of Wm. de S. (d. 1144) by Beatrice, daughter and eventually heiress of Geoffrey de Mandeville, earl of Essex, was summoned to Parliament, 1313-21, and thereby according to modern doctrine is held to have been created baron. On the death without issue in 1399 of his great-granddaughter, Elizabeth, the representation passed to the descendants of her Aunt Joan, wife of Sir Wm. de Fiennes (d. 1361). Her grandson, Sir James Fleumes, was summoned to Parliament, March 3, 1446-7 as Lord S. and S., and was beheaded by Jack Cade (1450). After the death of his son Wm. in 1471, his heirs were not summoned until Richard Lord S. and S. (d. 1503) was by letters patent to himself and his heirs generally recognised as Lord S. and S. As, however, he took his seat in Parliament as a junior baron, these letters are regarded as having effected a new creation. His son Wm. was made a viscount, which title became extinct on the death of his grandson Wm. The barony now passed to Cecily, daughter of John Twynleton by Elizabeth, sister and heiress of the last viscount. Her great-grandson, Thomas, claimed and was allowed the barony, and as such was summoned to Parliament in 1781, and from him the present baron, who succeeded to the title in 1946, descends.

Sayana (fl. c. 1380), Indian scholar and commentator of the *Irig-Veda*. Authorities are divided as to whether he was the younger brother of Madhava Acharya, the Indian statesman and philosopher, or whether these two names refer to the same person.

Sayansk Mountains, on the borders of Siberia and Mongolia, separating Irkutsk

from China. An extension of the Altai Mts., the average height is 6000 ft.; Mungo-Sardyk Mt. reaches over 11,400 ft.

Sayers, Dorothy Leigh (b. 1893), Eng. writer, b. at Oxford. She studied at Somerville College, Oxford. In 1926 she married Capt. Atherton Fleming. After publishing two books of verse, *Op. 1* (1916), and *Catholic Tales* (1919), she began a long series of detective novels with *Whose Body?* (1923). Among the most successful of those which followed are *Strong Poison* (1930); *Hangman's Holiday* (1933); and *The Nine Tailors* (1934). Miss S. produced her first play, *The Zeal of Thy House*, in 1926, and in 1942 she wrote a remarkable radio play, *The Man born to be King*. She is also the author of sev. vols. of essays, including *The Lost Tools of Learning* (1946), and *Creed and Chaos* (1947).

Scab, see under SHEEP.

Scabbard, case or sheath which protects the blade of a sword, dagger, or bayonet when not in use. The S. has been the object of art in its ornamentation from earliest times, usually being decorated with carving or other ornamental work.

Scabies, see ITCH.

Scabious (*Scabiosa*), genus of ann. and perennial plants (family Dipsacaceae, the Teasel family). Three species are Brit., occurring abundantly in cornfields and on dry pastures, and bearing lilac, purple, or white flowers. Sev. species are grown in the flower garden and rockery.

Scafell Pike, mt. belonging to the Cumberland group, in S. Cumberland, England. It is the highest point in England (3210 ft.), and is easily ascended from Wasdale. Its lower summit, Scafell, is 3162 ft. high.

Scaffolding, term for the framework of poles and planks used by builders. A typical scaffold for building brick walls consists of fir poles, or *standards*, about 10 ft. apart and erected 4 to 6 ft. in front of the wall being built; to these standards are lashed horizontal *ledgers* at about 4 ft. intervals in height; *putlogs* are then placed with one end on the ledgers and the other end on the wall, as the latter is being built; the scaffold boards are laid on these putlogs; diagonal *braces* are used to stiffen the scaffold, as also are ties through window or door openings to the interior of the building. For stone walls an extra row of standards near the wall face is generally used, thus obviating the necessity of leaving out stones in the face of the wall. These timber scaffolds are still used but have been largely displaced by tubular steel scaffolds, erected in much the same manner as the timber scaffolds but with special patent *couplers* instead of rope lashings. Aluminium tubes are also used. Small houses in the N. of England are often built from inside (overhand work) by the aid of small trestles about 5 ft. high. *Suspended scaffolds* are frequently used for painting and repairing buildings, and even for building the external walls of steel-framed buildings, the cradles (or boats) being suspended by wire ropes from outriggers at *eaves* level. The cradles can be raised or lowered, and sometimes moved laterally, by the work-

men in them. When building walls the suspended S. is sometimes continuous along the length of the building. For steel and the more complex forms of S. specialist firms are now employed, and all S. is subject to official regulations.

Scagliola, imitation stone-work for interiors. It consists of fine plaster of Paris mixed with glue, applied to a prepared surface, and polished by a variety of processes. Pieces of fibrous gypsum, marble, etc., may be pressed into the plaster before it sets, and many colours can be obtained by the use of earthy pigments. S. does not weather well, so that it is not adapted for the ornamentation of exteriors.

Scala, Della, or Scaligeri, name of a Veronese family ennobled in the person of Mastino Della S., *podestà* of Verona in 1259, who died there in 1277. He and his successors sided with the Ghibelline faction; he was succeeded by his brother, Alberto, who died in 1301. His son, Bartolomeo, who followed him, reigned only two and a half years. Next in order was Alboino, the brother of the preceding, who bought from the Emperor Henry VII. the title of vicar imperial of Verona. He died in 1311, and was succeeded by Can Grande I., the protector of Dante in his exile and a noted patron of arts and letters, who died at Treviso in 1329. His nephew, Mastino II., was the next of the Veronese sovereigns; he died in 1351 after having lost a large portion of his dominions in the attempt to enlarge them. At his death his son, Can Grande II., succeeded. He was the builder of the Castel Vecchio, and died in 1359 at the hands of his brother, Can Signorico, who followed him; he was the last of the legitimate line, and after procuring the death of his younger brother, Paolo Antonio, died in 1375, the lordship going to his natural sons, Bartolomeo and Antonio. Bartolomeo was murdered in 1381 by his brother, who died in 1388.

Scala, La, prin. theatre of Italy, on the Piazza della Scala, Milan, completed in 1778 to the designs of Piermarini of Foligno, with paintings by Levati and Reina, at a total cost of 1,000,000 lire. The interior is of horseshoe form, 330 ft. long by 122 ft. wide. The stage is 145 ft. long and 98 ft. wide. L. S. seats 3600 spectators, and is the second largest theatre in Europe. It affords employment to nearly 1000 persons. Attached to the theatre is a dancing school, and two charitable institutions, besides a theatrical museum. The theatre was restored in 1878, and again in 1922. It was the scene of the first production of most of Verdi's operas, and of Puccini's *Madame Butterfly* and *Turandot*. See L. Romani, *Teatro alla Scala, 1778-1862, 1862*, and G. Marangoni and C. Vanblanchi, *La Scala, 1922*.

Scala, Santa, see SANTA SCALA.

Scalabis, see SANTARIUM.

Scalds, see BURNS AND SCALDS.

Scalds, see SKALDS.

Scale (Lat. *scala*, ladder): 1. In music, the succession of notes in an octave. Various S. exist in different parts of the world, but in W. music the diatonic, tonal (or whole tone), and chromatic (or dodecuple) are the most important. The

diatonic Ss. of C are (major) C D E F G A B C, (relative minor, melodic) A B C D E F* G# A, (relative minor, harmonic) A B C D E F G# A. The tonal S. of C progresses in whole tones, C D E F* G# A# C. The chromatic S. includes all the semitones. For derivation of S., see HARMONY; see also TEMPERAMENT. 2. In maps, see MAP READING.

Scale Force, waterfall of Cumberland, England, about 3 in. up Scale Beck, which runs into Crummock Water. The fall with some surrounding land was bought by means of public subscriptions and transferred to the National Trust between 1935 and 1937.

Scale Insects, see COCCUS.

Scales, Lord, see RIVERS, EARL.

Scales. Scalar quantities are represented by lines, areas, etc., with a given unit. For many, e.g. length, etc., S. are made of wood or metal and graduated. Such S. may be so arranged as to reduce proportionally natural dimensions. Others, again, are combinations which may be used for mechanically performing calculations (see SLIDE RULE). *Scales of notation*.—The ordinary system of notation expresses all numbers by arrangements of ten symbols: 1, 2, ..., 9, 0. For example, $356 \cdot 24 = 3 \cdot 10^2 + 5 \cdot 10 + 6 + 2/10 + 4/10^2$; this is the common or *denary* S., and its *radix* is 10. But any radix might be taken. Thus the duodenary S. is based on 12; the sexagesimal on 60. The former is used in the duodecimals of carpentry and the building trade generally, where 12 in. make the foot; the latter was in use among the Alexandrian and Chaldean astronomers, and would be extremely useful in calculations where 60 sec. = 1 min., 60 min. = 1 hr., were it not that the symbols become excessive or the arrangement complicated; 12 has the advantage of its factors 2, 3, 4, 6; while 10 has only 2 and 5; 60 combines the advantages of both. To transform 356 from the denary to the duodenary S. we may proceed as follows:

$$\begin{aligned} 356 &= 300 + 50 + 6 \\ &= (2 \times 12^2 + 1 \times 12) + (4 \times 12 + 2) + 6 \\ &= 2 \times 12^2 + 5 \times 12 + 8 \\ &= 258, \text{ omitting the radix symbols.} \end{aligned}$$

Scales, see BALANCE; MUSIC (or MUSICAL NOTATION); WEIGHING MACHINES.

Scales, flat structures developed from the skins of many animals. The S. of most fishes are derived from the dermis, or under skin. They are classified as *cycloid*, or circular; *ctenoid*, or tooth-edged; *ganoid*, or enamelled; and *placoid*, or tabular. S. of reptiles are derived from the epidermis, or outer skin. Birds possess S. on their legs. Some mammals possess S.: pangolins, armadillos; rats, beavers, and some marsupials on the tails. The patterns on the wings of the butterfly and similar insects, are formed by scales, which fit so closely together that they appear to be a smooth surface.

Scaliger, Joseph Justus (1540–1609), greatest classical scholar of his age, b. at Agen, son of Julius Cesar S., a kinsman of the emperor Maximilian, and himself a distinguished scholar and soldier. S. began his education at the College de

Guienne at Bordeaux, but having been forced by the plague to return home, he continued his studies under his father and became a master of Lat. and of textual and historical criticism. After his father's death S. applied himself to Gk., Heb., and Arabic. Having travelled with Louis de Chastaigner he studied jurisprudence (1570–73) under Cujas at Valence and then settled at Geneva as prof. in the univ. Here he produced his eds. of the *Catalecta* and *Festus* (1575), and of Catullus, Tibullus, and Propertius (1577). His eds. of Manilius (1579) and *De emendatione temporum* (1583) are a landmark in the hist. of scholarship, for he thereby revolutionised the whole study of ant. chronology. The latter work was followed by the *Thesaurus temporum*; but perhaps his greatest achievement was his reconstruction, from the most slender material, of the lost *Chronicle* of Eusebius (printed 1606), one of the most valuable documents of antiquity. In 1593 S. succeeded Lipsius at Leyden Univ. In the following year he unwisely pub. his *Epistula* in which he glorified his family and claimed descent from the house of Scala (q.v.). Scloppeus, on behalf of the Jesuits, demolished his boast in *Scaliger Hyperbolicus*, and S. died embittered and disappointed. See life by J. Bernays, 1855, and J. E. Sandys, *History of Classical Scholarship* (vol. II.), 1904.

Scaligeri, see SCALA, DELLA.

Scaling Ladders. Tapering ladders fitted with metal brackets outside the 'strings' (sides) at the head, and with two similar brackets inside the strings at the base or heel for the purpose of fitting another length at either end; each separate length is interchangeable. S. L. are short (for firemen's use, 6 ft. 6 in.), light, and compact, being easily carried through narrow spaces, separately or fitted together as necessary. See also FIRE BRIGADES AND FIRE FIGHTING, *Fire 'Escapes' (Ladders)*, TOWER AND EXTENDING LADDERS.

Scallop, popular name of the genus *Pecten*, of lamellibranch molluscs with a characteristic shell of fine sculpture and often beautifully coloured. The S. is classed in the second order (Pillibranchia) of the Lamellibranchia (see MOLLUSCS) together with the mussel and the pearl oyster. There are a number of Brit. species; two, *Pecten maximus* and *P. opercularis*, the quins, are edible. The S. has a distinct foot which spins a byssus of attachment. The young are capable of rapid motion by opening and suddenly closing their valve. The shell of *P. jacobus*, called the St. James's shell, was a badge of certain knightly orders, and was also worn by pilgrims to the shrine of Compostella.

Scalp (Middle Dutch, *schelte*), shell, cognate also with scallop, scale, hairy covering of the cranium. It consists of (1) the skin; (2) the superficial fascia binding the skin to the muscles beneath; (3) the epicranium, consisting of the two parts of the occipito-frontalis muscle and the aponeurosis or tendon between them; (4) a layer of loose areolar tissue or lymph space allowing of free mobility of the

surface layers; and (5) the pericranium or periosteum investing the skull bones.

Scalping. Scythians, Celts, Teutons, and in more recent times, N. Amer. Indians, used partly to cut and partly tear off the forelock and part of the scalp of their usually dead, victim, as a trophy of victory. In America, Eng. and Fr. settlers used to scalp Indians, and retain the scalps as evidence of having killed them. Some states, at the time when the settlers used to fight the Indians, offered bounties for Indian scalps, e.g. Massachusetts offered \$40 for each scalp of a male Indian over twelve years old and \$20 for those of women and children.

Scaly Ant-eater, see **PANGOLIN.**

Scamander, anct. name of the Mendereş R., Asia Minor. It rose in Mt. Ida, flowed past Troy, and after uniting with the Simois emptied into the Hellespont.

Scammony, resin obtained from the root of *Convolvulus scammonia* (see **CONVOLVULUS**), *Ipomoea orizabensis* (producing Mexican jalap), and *Ezoponium simlans* (producing Tampico jalap), and prepared in the same way as jalap resin (see under **JALAP**). It is composed largely of scammonin, an ether-soluble resin hydrolysed to glucose and jalapinic acid. It is a drastic purgative.

Scandal. In law S. denotes 'an injurious report circulated or printed and pub., which may be the foundation either of a criminal prosecution, or of a civil action of damages, or of a combination of both.' It is thus merely a species of defamation, and may be either spoken (Eng. *slander*) or written (Eng. *libel*). It is sometimes used synonymously with 'verbal injury,' in the sense of 'contumelious words tending to expose a person's character by making him little or ridiculous.' Formerly, baro 'verbal injuries,' or hasty words uttered intemperately in a brawl, were tried by commissioners who as the *judices Christianatus* were the only judges of S., but later other criminal judges, and even the court of session, obtained such jurisdiction. Verbal injury was punished either by a fine proportioned to the condition of the persons injuring and injured, and the circumstances of time and place, or, if the injury imported *scandal*, by publicly acknowledging the offence. There appears to be no particular significance in the term S. in modern Scots law of defamation, which differs but little from the Eng. law, but it is to be noted that the distinction between *slander* and *libel* is not vital in Scots law.

Scandalum Magnatum, i.e. slander of great men. Upon the statute of 1271 directed against 'devilers of false news and tellers of horrible and false lies of prelates,' etc., was founded the obsolete action of S. M., long ago superseded by the ordinary action of libel or the mode of proceeding by crown office information.

Scanderbeg (Turkish Iskander Beg) (c. 1404-87), whose real name was George Castriota, an Albanian chieftain. He was taken as a hostage to Constantinople, where he became a favourite of Amurath II., embraced Islam, and was put at the head of a Turkish force. In 1443 he de-

serted, renounced Islam, and raising an army, declared the independence of Albania, which he successfully held against the Turks until his death.

Scanderoon, see **ALEXANDRETTA.**

Scandinavia, term applied to the peninsula of N. Europe formed by Norway (q.v.) and Sweden (q.v.). It is also sometimes extended to Denmark (q.v.) and Iceland (q.v.) as being inhabited by a Scandinavian race.

Scandinavian Languages constitute one of three divs. of the Germanic branch of the Indo-European languages (q.v.). The S. L. are represented by Icelandic, Norwegian, Swedish, and Dan., each of them having various dialects (see under **NORSE LANGUAGES**). While Swedish, Dan., and Norwegian differ from one another scarcely more than do some dialects within Eng., Icelandic is extremely archaic and differs relatively little from Old Norse: it still preserves the three grammatical genders, and has a full-fledged declensional system, with four cases. As compared with the other div. of the Germanic branch, i.e. the W. Germanic languages, the S. L. have relatively few speakers. Swedish is spoken throughout Sweden by about 6,500,000 people, and by a substantial Swedish minority in Finland. Dan. is spoken by about 4,000,000 people in Denmark, Greenland, the Virgin Is., and to some extent in Iceland. Icelandic is spoken by about 100,000 people in Iceland. The dialect of the Faroe Is. is spoken by about 30,000 people. The Norwegian dialects are the vernaculars of about 3,000,000 people. Till 1905, when Norway seceded from Sweden, its official language was still Dan. To-day it has two official languages, the *landsmål*, which is based on the Norwegian dialects, and the *riksmål*, which in the past was called 'Dano-Norwegian,' but the various changes introduced since the secession (some changes came into force in 1938) have yielded the result that literary Norwegian is now as close to Swedish as to Dan. Both languages, the *riksmål* and the *landsmål*, are taught in schools and used in the gov. service.

Scandium, metallic chemical element, symbol Sc, atomic number 21, atomic weight 45.1, was predicted to exist by Mendeleev (see **CHEMISTRY**) and was discovered by Nilson in 1879. It is one of the rare earth metals. The metal itself is difficult to isolate, but it forms colourless salts and an oxide Sc_2O_3 . S. occurs in many minerals, e.g. gadolinite, and certain tin ores, and is present in quantity in the sun and stars.

Scania, old prov. in the S. of Sweden, now included in the lns of Malmöhus and Kristianstad.

Scannabecchi, Lambert, see **HONORIUS** (popes). *Honorius II.*

Scansores, see **CLIMBERS.**

Scapa Flow, sea-basin in the Orkney Is., Scotland, nearly enclosed by Mainland, Burray, S. Ronaldshay, Walls, and Hoy. It was the chief base of the Grand Fleet during the First World War, and the ten battleships, fifteen cruisers, and forty-six torpedo-boats which were surrendered to Great Britain at the armistice were

interned here. In 1919, all the ships were scuttled by the order of Vice-Adm. von Reuter, but many have since been salvaged. S. F. was again a fleet base in the Second World War. Owing to deficiencies in anti-submarine defence a Ger. U-boat penetrated the basin on Oct. 11, 1939, and sunk the battleship *Royal Oak* at her anchorage with the loss of 810 men. The Home Fleet was thereafter withdrawn until the defences were strengthened. Length 15 m., breadth 8 m.



British Museum

SCARAB

This scarab commemorates the slaying of 102 lions by Amenhotep III. in the first ten years of his reign

Scapegoat, see **AZAZEL**.

Scaphoid Bone, name given to a boat-shaped bone in the tarsus, or instep, and to one in the carpus, or wrist.

Scapolite, term somewhat loosely employed to include the minerals of the scapolite group. They occur mainly in rocks, especially limestones, which have suffered contact metamorphism; and occasionally as secondary constituents of igneous rocks. All the S. contain some chlorine in combination. Meionite, $\text{Ca}_2\text{Al}_2\text{Si}_2\text{O}_7$, and marialite, $\text{Na}_2\text{Al}_2\text{Si}_2\text{O}_7\text{Cl}_2$, are like two 'end' types, but between these there are many isomorphous representatives, e.g. wernerite, mizzonite, etc. The minerals belong to the tetragonal system, and are usually in short, thick prisms which show a good basal cleavage. In colour they may be white, blue, green, or red. Meionite is found in blocks of altered limestone ejected from Vesuvius (Monte Somma). Wernerite occurs in Norway (Årendal). Its varieties are named nuttallite, passauite, and glaucolite. In chemical composition, and in some other respects, the S. resemble the line-soda feldspars.

Scapula, or **Shoulder-blade**, flat triangular bone situated at the back of the

shoulder. It articulates with the clavicle or collar-bone at the acromion, and with the humerus at the glenoid fossa.

Scarab, Egyptian seal shaped to represent the scarab beetle (*q.v.*). The under side was engraved with the device or inscription which was to be impressed upon the sealing clay. All Ss., however, were not used as seals. A few were used as amulets and others were cut in commemoration of some event. Ss. were made of pottery or paste, moulded in terra-cotta moulds, the under-side flattened with a knife. These and also Ss. made of soapstone were often glazed with blue, green, and violet glazes. Ss. were also made in many stones such as obsidian and amethyst, also in wood, and more rarely in gold and silver. Some blue-glass Ss. have been found belonging to the 18th Dynasty. The Ss. were sometimes strung upon a string or attached on a swivel to a metal ring which facilitated sealing. The inscriptions often denoted a magical charm which was the property of the S. The theory that Ss. were employed as coin is now discredited. They came into general use probably by the 12th Dynasty. No S. has been found in tombs anterior to the 6th Dynasty. In Rom. times S. disappear from use, but specimens have been found in Syria, Cyprus, Rhodes, Greece, Crete, Italy, and all places in the Mediterranean connected by trade with Egypt. See also **SEALS**, **ORNAMENTAL**.

Scarabæus, typical genus of Scarabæidae, is extremely interesting on account of the peculiar habits of its species. *S. sacer* is probably the sacred beetle of the Egyptians. The female rolls to her dwelling large balls of dung or earth for her consumption, and in the autumn deposits her eggs in similar balls.

Scaramouch (It. *scaramuccia*, skirmish), old It. comedy character, originally derived from Spain, representing a military poltroon and braggadocio. He was dressed as a Sp. don.

Scarborough (*Escarbeurg*, *Scardebure*), municipal bor. and fashionable watering place in the N. Riding of Yorkshire, England. It is divided into two parts, N. Bay and S. Bay, by the 'Scaur,' a bold peninsula (285 ft.), on which are the ruins of a twelfth-century castle, protected on the landward side by a moat. The old tn. lies just below the castle and extends S. to the ravine of the Rainsdale valley, over which the Valley Bridge leads to the fashionable S. part of the tn. The tn. developed as a health resort following the discovery of mineral springs in 1620. Whilst the waters are not now available, the spa remains a social centre with its concert-room, ballroom, cafés, etc. There are extensive promenades, including a great marine drive 4200 ft. long, opened in 1908. The N. Bay pool has 17,000 sq. ft. of swimming space for 800 bathers; the swimming pool at the S. Bay has accommodation for almost 1200 bathers. There are facilities for all kinds of outdoor games and for boating, sailing, horse-riding, and motor-cycle road-racing. There are periodic international

golf and tennis tournaments, and every Sept. there is a cricket festival. Here, too, are the headquarters of the Brit. Tunny Club. Built in the reign of Stephen, S. was a great fortress, part of the fiefs of Wm. of Crumale, earl of York, which was surrendered to Henry II. after his accession. Later besieged by Oliver Cromwell, Scarborough Castle remains to-day a majestic relic situated on the summit of the headland, where it towers above the Castle Dykes and the old tn. and harbour. It was among sev. historic tns. to receive a charter in the reign of Richard I. In the castle yard are remains of a Rom. signal station, near by, the graveyard of St. Mary's par. church contains the burial place of Anne Brontë. The surrounding countryside shows variety in heather-clad moors, secluded dales, stone-built vils. and many historical relics. Four miles away is Forge Valley, a noted beauty spot. S. was bombarded by the Ger. Fleet in 1914. In the Second World War approximately 170 bombs fell on the built-up area of the tn., but damage was not on a large scale and all of it had been repaired or cleared before the end of 1947. Pop. 44,800. See A. Rowntree, *A History of Scarborough*, 1931.

Scaridæ, *SCALLOP FISHES.*

Scarlatti, Alessandro (1659-1755), *b.* at Palermo, Sicily, leader and originator of Neapolitan opera, and an eminent teacher, harpsichordist, and vocalist, studied under Carissimi. His operas, which exceed 100, notably *La Rosaura* (1690), *Teodora* (1693), and *Tigrane* (1715), although consisting only of the usual string of arias and recitatives, placed him far above his contemporaries by reason of his beauty of melody, originality of orchestration, and use of the three-movement form of overture. He also composed masses, motets, twelve symphonies, and other works.

Scarlatti (Giuseppe), Domenico (1685-1757), son and pupil of Alessandro S., *b.* at Naples, was court musician to the queen of Poland (1709-15), for whom he wrote a few operas, e.g. *Narciso* and *Amleto*. From 1715 to 1719 he was at St. Peter's, Rome, and wrote only sacred music, and in 1719-21 he appeared in London as an unsuccessful rival to Handel. During his long stay in Spain (1728-51), where he was attached to the court of Madrid, he wrote most of his clavichord music, which was especially important in extending technique. His works include masses and operas.

Scarlet Fever, or **Scarlatina**, acute, contagious disease characterised by the formation of a brilliant red rash. It is generally believed to be of microbic origin; Drs. G. F. and G. H. Dick of Chicago have shown that it is caused by hæmolytic streptococci in the throat, whence toxins are carried to other parts of the body. The disease may attack individuals of all ages, but is generally confined to children between two and fifteen years. The period of incubation is rarely longer than a week. The preliminary symptoms are *malaise*, headache, and sore throat. In about twenty-

four hours a rash appears on the chest and neck, rapidly spreading to the limbs, until the whole of the body, except the face, is involved. The rash consists of red papules, which are formed so close together that a homogeneous red surface is presented. Feverish symptoms set in, the tongue becomes furred and soon takes on the appearance known as 'strawberry tongue,' the throat is red and swollen, and the glands under the jaw may be enlarged. In these early stages (the first three days) the 'Dick' test is positive; ten days or so later it becomes negative. In less than a week the eruption disappears, the temp. becomes normal, or nearly so, and the process of desquamation or 'peeling' commences. The skin comes off in branny particles from the greater part of the body, but where the skin is thick, as in the hands and feet, large pieces come off, sometimes forming a mould of the part. Desquamation may take six weeks or more, and during this period complications may set in, as acute throat inflammation, suppuration of glands, suppuration of the nose or ear, kidney inflammation leading to Bright's disease; rheumatic fever is also a common result of scarlet fever. The patient must be isolated; light food should be given through the febrile stage, and symptoms should be treated as they occur. Polyvalent serums have been tried with some success.

Scarlet Runner, see BEAN.

Scarlett, Sir James, see ABINGER, BARON.

Scarpa, Antonio (1747-1832), It. anatomist and surgeon; *b.* at Motta, near Treviso. He was one of the more celebrated pupils of Morgagni (*q.v.*), the founder of pathological anatomy, and became prof. of anatomy at Modena in 1772, and at Pavia in 1784. He was one of the greatest clinical surgeons in Europe and was known especially for his work on the anatomy of the ear, nerve ganglia, and bones. It was S. who first demonstrated that the heart is supplied with nerves.

Scarpanto, is. in the Ægean Sea, 30 m. long and from 3 to 7 m. wide, with an area of 120 sq. m. Originally a Turkish is. named Karpathos, like other Ægean is., it was occupied by Italy in 1912 and, in 1924, ceded by the treaty of Lausanne. Pop. 9000.

Scarpe, riv. of France, rising in the Pas-de-Calais dept. The Doule joins it near Arras, and from there, in a canal, it passes Douai to join the Scheldt near St. Amand. Scarpe is the official Brit. name for the first part of the fifth battle of Arras in the First World War. See FRANCE AND FLANDERS, FIRST WORLD WAR CAMPAIGNS IN.

Scarron, Paul (1610-60), Fr. comic poet, dramatist, and satirist, *b.* in Paris, by a family arrangement was compelled to enter upon an eccles. life, for which his character and habits were ill suited. About 1637 he was crippled by disease. In 1652 he became acquainted with Mlle d'Aubigne, afterwards Mme de Maintenon, whom he subsequently married. Chastened by her influence, the society of his house, always a favourite resort of

the wits, became still more select and brilliant. Among his first works were *Légendes de Bourbon* and *Recueil de quelques vers burlesques*. In 1644 he pub. *Typhon*, a burlesque poem, which earned him a great reputation. His best-known dramatic works are *L'Héritier ridicule*, *Don Japhet d'Arménie*, *L'Écolier de Salamauque*, and *Le Marquis ridicule*. His *Virgile travesti* was very popular and much imitated; and *Le Roman comique* (1651-57) was trans. into Eng. by Oliver Goldsmith. See P. Morillot, *Scarron et le genre burlesque*, 1888; T. Brown and others, *The Comical Romance* (with life by J. J. Jusserand), 1892; and E. Magne, *Scarron et son milieu*, 1905.

Scaup, or *Nyroca marila*, species of Anatidae which frequents N. Europe, Asia, and America. In colour the male duck is chiefly of a greenish-black with black and white markings, but the female is rufous.

Scaurus, Marcus Æmilius (c. 163-89 B.C.), Rom. statesman, member of the ant. Æmilian patrician clan. He served in the army and became curule ædile, prætor, and in 115 consul. In 112 he commanded the embassy sent to Africa to adjudicate between Jugurtha and Adherbal, and in 111 served as legato to Calpurnius in the war against Jugurtha. Both he and Calpurnius were charged with venality, but S. had himself appointed one of the prosecutors; though he thereby secured him-self he was unable to save any of his accomplices. He was censor in 109 and constructed the Via Æmilia, and was consul again in 107. His son, **Marcus Æmilius Scaurus**, served as questor to Pompey in the third Mithridatic war (74-61 B.C.) and was left in command of Judæa.

Scavage, or **Shewage** (A.-S. *scæwian*, to show), in ant. customs, a toll or duty exacted of merchant-strangers by mayors, sheriffs, etc., for goods *shown* or offered for sale within their precincts. Henry VII. abolished it.

Scawfell, see **SCATELLE**.

Scents, see **PERFUMERY**.

Scepticism, or the philosophy of doubting, has two main ideas: (1) that to arrive at truth one must believe everything to be false until it is proved to be true—a denial of the primary instinct which is to believe the opposite; and (2) that human knowledge can never arrive at truth—a denial of objective knowledge. S. arises as a necessary reaction to dogmatism, since the assertions of various dogmatic schools can be pitted against each other until all is a chaos or contradiction. Thus the Sophist school under Protagoras and Gorgias, arose (c. 440 B.C.) against the conflicting cosmological dogmas of Heraclitus and Parmenides and the ethical ideas of the city states. The course of S. was halted for a century by the great constructive systems of Plato and Aristotle (see **KNOWLEDGE**). The first school of S. originated with Pyrrho of Elis (c. 300 B.C.), who concluded, like the Stoics and Epicureans, that the aim of life is self-centred individual happiness, attained only in mental serenity born of

total submission. This teaching was largely influenced by the Protagorean denial of the possibility of real knowledge on the ground that individual and momentary cognition alone is possible. The adherents of this school extended S. even to the principles of their own doubt. About A.D. 200 Sextus Empiricus attacked all forms of Græco-Rom. thought, especially the materialism of the Stoics. With the Renaissance, Montaigne (1533-1592) began to diffuse an atmosphere of S., presaging Bayle's *Dictionnaire* (1697). The method of Descartes (q.v.) was also founded on doubt, admitting as fundamentally true only *cogito, ergo sum*. S.'s greatest exponent was the empirical philosopher Hume, who in his *Treatise* (1739-40) opposed sense-impression to reason, denied the relation of cause and effect, and isolated perceptions; his sensational S. may therefore be termed the modern Protagoreanism. The sceptical attitude may be traced in Kant (q.v.), who reconciled it with dogmatism to produce criticism, and in Hegel (q.v.), who asserted that in every philosophical speculation there must be a sceptical moment. Chief of the 'Christian sceptics' is Pascal (q.v.), for whom there is no truth outside Christ and His revelation. Albrecht Ritschl (1822-88) upheld the view of the Agnostics that religion is preserved only at the price of objective truth. See E. Zeller, *Stoics, Epicureans, and Sceptics*, 1880, and *Outlines of the History of Greek Philosophy*, 1886; J. Owen, *The Sceptics of the Italian Renaissance*, 1893, and *The Sceptics of the French Renaissance*, 1893; and E. Boyan, *Stoics and Sceptics*, 1913, and *The Hellenistic Age*, 1927.

Sceptre (Gk. *σκήπτρον*, staff, from *σκηπτάω*, to lean on), rod symbolic of authority common to the royalty of all nations from the earliest times. In Homer we read of the S. in the hands of kings, priests, military commanders, and heralds. The length, form, and ornaments have varied from age to age and place to place. The Egyptian pharaohs are usually depicted carrying a S. in the form of a flail. Among the Gks. the S. was generally long and straight, adorned with golden studs and sometimes terminating in the form of a lance. The Rom. consuls bore the S. surmounted with an eagle. The same insignia were used by generals who celebrated a triumph. It was retained by the emperors, and the Byzantine sovereigns placed a globe between the staff and the eagle. Some of the successors of Phocas used instead of the S. a globe surmounted with an eagle. In the late empire we find a new type of S. known as the 'marthex,' a staff topped with a cross pattée. Among the barbarian kings mention may be made of the eagle S. of Clovis and Dagobert's many-branched staff.

In France from a very early date the royal S. was tipped with a fleur-de-lis which under the empire was replaced by an eagle. Richard I. of England is shown on his seal with a S. and cross in the right hand and another with a dove in the left; these two remain part of the coronation

insignia to this day. Other forms of S. in use are the baton of a field-marshal, and those of the earl marshal, the kings of arms, and various officers of the royal court.

Scève, Maurice (d. 1564), Fr. poet, b. at Lyons, leader of the so-called school of Lyons, whose verse marks the transition from Marot to Ronsard. His works include *Delic, objet de plus haute vertu* (1544), a collection of over 400 *dizains* in honour of his lady love, and *Le Microcosme* (1562), a descriptive poem in Alexandrines, setting forth the hist. of man on earth.

Schaarbeek, tn. in Brabant, Belgium, forming the most important and a much industrialised suburb of Brussels, just N. of the city itself. It has manufs. of caoutchouc, furniture, gloves, soap, cement, chocolate, cigars, and silver-paper. Pop. 123,600.

Schaacht, Hjalmar Horace Greeley (b. 1877), Ger. economist and financier, b. at Kiel, became manager and, later, partner, in a bank at Bremen. After the First World War he joined the Ger. Democratic party, and devised the plan for the restoration of a stable currency by means of the issue of the *Rentenmark* after the Ger. inflation of 1923. From that year until 1930 he was a member of the Reichsbank, taking part in the conference that led to the Dawes plan (q.v.). After 1930 he left the Democratic party, attacked reparations, and tried to modify the policy of borrowing foreign money for the support of Ger. industry. He was an active supporter of the Nazi party before its accession to power on Jan. 13, 1933, and supported the appointment of Hitler to the post of chancellor. After that date he played an important role in the vigorous rearmament programme which was adopted, using the proceeds of the Reichsbank to the fullest extent in the Ger. effort. On Jan. 2, 1939, however, S. urged Hitler to reduce expenditure for armaments as the only way to balance the budget and prevent inflation, and was soon afterwards dismissed from office. On July 23, 1944, S. was arrested by the Gestapo, and confined in a concentration camp until the end of the war. He was among the principals accused at the first trial of war criminals at Nuremberg (see NUREMBERG WAR CRIMES TRIALS), but was acquitted. He was then set at liberty only to be brought before the Ger. people's court, at Stuttgart, as a major offender under the 'denazification' laws, and sentenced on May 13, 1947, to eight years' detention in a labour camp. S., however, successfully appealed from this sentence (Sept. 2) and was released from internment. See his *Account Settled* (1919).

Schadow, Johann Gottfried (1764-1850). Ger. sculptor, b. in Berlin, and studied at Rome. He was court sculptor and secretary to the Berlin Academy (1788), and director of the latter (1810). His best-known statues are those of Frederick the Great (Stettin), Bitcher (Rostock), Luther (Wittenberg), and the bronze 'Quadriga' on the Brandenburg Gate (Berlin). The lesser-known 'Memorial to Queen Luisa of

Prussia' is a work of enduring beauty. S. worked in the classicist style, inspired by Gk. and Rom. art. While much of his work is over-conventional, it has on the whole a great sensitiveness in expression and treatment, which makes S. stand out among other classicist sculptors.

See *Die Kunst der Romantik und des Klassizismus*, Propyläen Hist. of Art, Munich, 1929, and life by F. Nornitz, 1938.

Schaffhausen, cap. of the Swiss canton of that name, situated 31 m. W. of Constantine. It lies above the famous falls of the Rhine, which are used for industrial purposes. Its streets are narrow, its architecture medieval, including a twelfth-century Romanesque basilica, and it is overlooked by the fortress of Unioth or Munoth. Manufs. include silk and cotton goods, earthenware, tobacco, railway requisites, wrought steel wares, and iron wire. Pop. 22,500. It was made an imperial city in 1208, and in 1151 made an alliance with six of the Swiss confederates. The tn. suffered much from the Thirty Years war, but its arrested development gave place to renewed industrial activity in the nineteenth century. S. was bombed accidentally by the Amers. on April 1, 1914. Area of canton 115 sq. m., pop. 53,800.

Scharlieb, Dame Mary Ann Dacomb (1845-1930), Brit. gynecologist and surgeon, b. in London. Educated at Manchester and New Brighton, she married W. M. S., a lawyer, of Madras, where she learned the pressing need of qualified medical women. In 1871 she entered the Madras Medical College as a student, receiving the diploma there in 1878. On her return to England she studied at the Royal Free Hospital, graduating with distinction in 1882, and winning the gold medal and scholarship in obstetrics. In 1884 she was appointed lecturer in midwifery and gynecology to the medical college at Madras. Three years later she founded the Royal Victoria Hospital for caste and Goshia women. She graduated M.D. of London Univ., being the first woman to do so, and in 1888 she was appointed clinical assistant to Mrs. Garrett Anderson at the New Hospital for Women, joint lecturer in medical jurisprudence at Handel Street School of Medicine, and surgeon to the New Hospital for Women. M.R.C.S. in 1897. In 1901 she was elected gynecologist at the Royal Free Hospital; D.B.E., 1926. Pubs.: *Straight Talks to Women* (1895); *Welfare of the Expectant Mother* (1919); and *The Psychology of Childhood* (1927); also *Reminiscences* (1924).

Scharnhorst, Gerhard Johann David von (1755-1813), Prussian soldier, b. at Bordenhau, near Hanover. Entering the army in 1778, he fought in the Flinders campaigns of 1793-95. In 1801 he became director of the military academy, Berlin. Chief of the general staff in the war of 1806, he distinguished himself in the retreat of the Prussian Army, being wounded at Auerstadt. His greatest work was the reorganisation of the Prussian Army, based on universal conscription, after the collapse of 1806-7. S. died

from the effects of a wound received at Lützen. See life by M. Lehmann, 1886-1888.

'Scharnhorst,' Ger. battleship, see NAVAL OPERATIONS IN SECOND WORLD WAR, *Escape of 'Gneisenau,' 'Scharnhorst,' and 'Prinz Eugen,' and Naval Operations, 1943.*

Schässburg, see SIEGENSBURG.

Schaumburg-Lippe, former principality of the Ger. Empire, proclaimed a republic in Nov. 1918, was bounded by Westphalia and Hanover. With an area of 131 sq. m., most of it is comprised in the N. Ger. plain, and agriculture is the chief industry. In the highland region there are productive coal-mines, especially round Bückeburg, the cap. In 1946 it was included in Lower Saxony. Pop. 54,000.

Schechem, see NABLUS.

Schedone, Bartolomeo, see SCHIDONI.

Scheele, Karl Wilhelm (1742-86), Swedish chemist, b. at Stralsund. He was apprenticed to a chemist at Gothenburg, and subsequently devoted his life to chemical experiment, making numerous inventions and discoveries. Among other substances he discovered oxygen; chlorine; glycerol; tartaric, benzoic, oxalic, and hydrofluoric acids, and a host of compounds, and described the pigment called Scheele's green and prussic acid. See life by A. Nordenskiöld, 1893.

Scheffer, Ary (1793-1858), Fr. historical painter, b. at Dordrecht in Holland, friend of La Fayette. He studied under Guérin in Paris, and achieved much popularity with his subject paintings; Versailles has a large collection of his portraits. He painted 'Femmes soulevées' (1827); 'Le Larmoyeur' and 'Francesca da Rimini' (1835); 'Les Mignons' (1836); 'Femmes saintes' (1847); 'Temptation' (1851); portrait of Charles Dickens (1856), etc.

Scheffler, Johann, see ANGELUS SILESIUS.

Scheidegg, or Scheideck, two mt. passes of Switzerland, Great and Little. The former is in the canton of Bern, between the Grindelwald valley and the Haslithal; altitude 6134 ft. The latter is S.W. of the above, between Grindelwald and Lauterbrunnen; it is 6788 ft. high, and is noted for its fine panorama of the Jungfrau.

Scheidemann, Philipp (1865-1939), Ger. Socialist politician, b. at Kassel, which place he represented in the Reichstag. His work for the Socialist movement began when it was still banned under Bismarck's anti-Socialist law. In 1903 he was elected to the Reichstag, and in 1911 joined the executive committee of the Social-Democratic party. During the First World War he was, together with Friedrich Ebert (q.v.), leader of the 'Majority' Social Democrats, who voted for the gov.'s war credits, but nevertheless worked hard for a peace of reconciliation, free from annexations and indemnities. With the introduction of responsible parl. gov. under Prince Max of Baden's chancellorship S. was minister without portfolio. But the hopes which the military leaders had entertained that his inclusion in the gov. would, by retaining the loyalty of the Socialist workers, avert internal collapse, failed, and when, in 1918, the

kaiser abdicated and Ebert became chancellor, S., on his own initiative, proclaimed Germany a republic in the presence of the revolutionary crowds assembled before the Reichstag. He became a member of the provisional Republican Gov., and in Feb. 1919 was elected Prime Minister by the National Assembly at Weimar. A few months later he resigned, following his failure to obtain amendments of the allies' peace conditions, and his refusal to sign the treaty of Versailles. He was elected chief burgomaster of Kassel, and remained a member of the Reichstag, but his political influence declined. On the advent of the Hitler regime, which made him the target of fierce attacks, he fled from Germany, first to Czechoslovakia, and later to Denmark.

Schelde, see SCHELDIT.

Scheldt (Flem. Schelde; Fr. Escaut), riv. of France, Belgium, and Holland, rising in the dept. of Aisne, France, and flowing through the Belgian provs. of Hainaut, E. Flanders, and Antwerp into Holland, where it falls in the North Sea near Flushing (Dutch Vlissingen). Its total course is 270 m., navigable as far as Cambrai (France), 211 m. from the sea. The chief tribs. are the Lys (Flem. Lele), Dender, Durme, and Rupel, and it is connected with the Somme, Seine, Sambre, Meuse, Rhine, and prin. rvs. of Belgium by canals. In its lower course it traverses a flat country, protected by dykes against the tide, perceptible as far as Ghent and reaching at Antwerp a height of 13 ft. In 1940 the battle of the S. raged from May 20 to 23, and was particularly heavy round Tournai (q.v.). In 1944 the complete liberation of the mouth of the S. was of great strategical importance owing to the fact that the port of Antwerp was liberated almost undamaged in Sept. The battle of Walcheren, the Dutch is., commanding the mouth of the S., began on Nov. 1. The riv. was reopened to traffic on Nov. 28, 1944.

Schellenberg: 1. Tn. in Saxony, Germany, near S.E. border of Bavaria, 9 m. S. of Salzburg, and 8 m. E. of Chemnitz. Pop. 1100. 2. Also the name of one of the two cos. of Liechtenstein, the other being Vaduz.

Schelling, Friedrich Wilhelm Joseph von (1775-1854), Ger. idealistic philosopher, b. at Leonberg, in Württemberg, after studying at Tübingen and Leipzig joined Fichte (q.v.) as lecturer at Jena (1798-1803). The period 1803-6, which marks his rupture with Fichte and Hegel (q.v.) was spent in lecturing at Würzburg. In 1806 he moved to Munich, where he became secretary of the academy of art, and later of the academy of science; without relinquishing these appointments he lectured at Erlangen for seven years (1820-27). Finally, in 1841, he became a member of the academy of Berlin, where he lectured for four years at the univ. Apart from unimportant early Fichtean writings (1794-1796), his chief works were *Ideas for a Philosophy of Nature* (1797); *System of Transcendental Idealism* (1800); and *The Nature of Human Freedom* (1809). His system, known as objective idealism,

regarded nature-philosophy and spirit-philosophy as co-ordinated and equal factors in the complete system of philosophy, instead of subordinating the objective (material, real) to the subjective (ideal, transcendental) as Fichte had done. S. was thus, as Schopenhauer said, the conciliator of idealism and realism; and therefore artistic genius, which presents objective and subjective in combined expression, was to him the highest type of human consciousness. S. was strongly influenced by Spinoza in formulating his expression of the fundamental source from which both real and ideal are derived, i.e. the Infinite, of which real nature and spiritual (or transcendental) ideals are different but mutually explanatory attributes. This Infinite, or God, is not unlike the will-to-live of Schopenhauer (q.v.). Original complete works (14 vols., 1856-1861; new ed., 1927ff.) issued by his sons. See C. Frantz, *Schelling's Positive Philosophy*, 1879-80; J. Watson, *Schelling's Transcendental Idealism*, 1883; H. Knittermeyer, *Schelling und die romantische Schule*, 1928; and H. Fuhrmann, *Schellings letzte Philosophie*, 1940.

Schelly, see under CORONOUS.

Schenectady, city of New York, U.S.A., cap. of S. co., on the Mohawk R., 16 m. N.W. of Albany. An important manufacturing centre, and has electrical and locomotive works, machine shops, laboratories of the General Electric Company, and manufs. of brooms, fireworks, mica insulators, baseballs, and electrical wiring devices. Pop. 87,500.

Schenk Test, see METALLURGY (METAL TESTING).

Scherzo (It., 'jest', 'sport'), musical term signifying a movement of a light or humorous character, generally forming one movement of a work of some length, such as a symphony or sonata. It may be an independent work, as the Sz. of Chopin for piano. It was estab. mainly by Beethoven and Schubert. The term dates back to the seventeenth century, when It. canzonets were often called *scherzi musicali*, and instrumental pieces were also sometimes pub. under that title.

Scheveningen, tn. and seaside resort of the Netherlands, 1 m. N.W. of The Hague, on the W. coast of Holland. It has one of the finest beaches on the North Sea, and is much frequented by visitors during the season. There is an important fishery. Here was fought in 1653 the naval battle between the Dutch under De Ruyter and Van Tromp, and the allied Brit. and Fr. fleets, resulting in the victory of the latter and the death of Van Tromp. Twenty years later De Ruyter here defeated the Fr. and Eng.

Schiaparelli, Giovanni Virginio (1835-1910), It. astronomer, b. at Savigliano and educated at Turin Univ. He studied astronomy at Berlin. After holding posts as assistant observer at Pulkova and Milan, he was appointed in 1862 director of Milan observatory, retaining this position till 1900. He was the first to show that certain meteor streams were the products of disintegrated comets, for which he was awarded the gold

medal of the Royal Astronomical Society in 1872. Besides the pub. of his work on meteors, double stars, and the so-called canals of Mars, he wrote *Note e riflessioni sulla teoria astronomica delle stelle cadenti* (1870); *I precursori di Copernico nell' antichità* (1876); and *L'Astronomia nell' antico Testamento* (1903), trans. into Eng. and Ger.

Schick Test, see under DIPHTHERIA.

Schidoni (or **Schedone**), **Bartolomeo** (1560-1616), It. painter, b. at Modona. Painted after the style of Correggio and Raphael, his works are extremely rare, but amongst them are a 'Holy Family' and an 'Entombment' in the Louvre.

Schiedam, tn. of S. Holland, 4 m. W. of Rotterdam, the chief centre of the famous 'Hollands' gin. It also makes liqueurs and candles, and has a shipping trade and iron works. Pop. 69,000.

Schiehallion, mt. in the N.W. of Perthshire, Scotland, 9½ m. W.N.W. of Aberfeldy. Altitude 3517 ft. It was the scene of experiments in the earth's mean density, conducted by Nevil Maskelyne in 1774.

Schiller, Johann Christoph Friedrich (von) (1759-1805), Ger. poet, b. at Marbach on the Neckar. His father was an army surgeon, and though he held the rank of captain the family lived in poor circumstances. As an officer's son he went to the military school, which was under the supervision of the Duke Karl Eugen of Wurttemberg. He began as a student of jurisprudence, but disliking this subject, he changed to medicine, on his father's advice. A chance glimpse of Goethe, however, determined him to become a poet. After some early attempts at dramatic writing S. completed (1781) *Die Rauber* (The Robbers). It was first performed in Mannheim in 1782. Its preface, 'In Tyrannos,' shows the spirit in which this work was written. An effective stage-piece, it was not a good play. In France, however, *Die Rauber* was so successful that the Fr. revolutionary gov. made S. an honorary citizen of the Fr. Republic, whilst the duke of Wurttemberg was so indignant at the rebellious ideas contained in this work that he ordered fourteen days' imprisonment for the young author, who was forbidden to write any further comedies. S. escaped, and finally reached the vil. of Bauerbach in Thuringia, where he was received by Frau von Wolzogen. Here he wrote and finished within a year the tragedies *Luise Müllerin* (usually called *Kabale und Liebe*) and *Piesco* (his first historical drama). He also began work on *Don Carlos*, which was pub. ten years later.

In 1783 S. returned to Mannheim where Dalberg, director of the Mannheim Theatre, made him the 'theatre poet.' As such he trans. Shakespeare's *Macbeth*. He also began two important prose essays, *Philosophische Briefe an 'Die Schaubühne als eine Moralische Anstalt'*. In Dec. 1, 4 he met the duke of Weimar, Goethe's friend, who, greatly impressed with S., gave him the title of *Rat*. His position in Mannheim being no longer

tenable, he went to Leipzig at the invitation of his friend C. G. Körner, a man of letters and father of the Ger. poet Theodor Körner. There, for the first time, he was happy. He was the centre of a circle of good friends. The famous ode, *Lied an die Freude*, expressed his feelings. This became world-famous as the choral finale of Beethoven's Ninth Symphony. Here he also wrote powerfully dramatic psychological studies, *Der Verbrecher aus verlorener Ehre* (1786) and *Der Geistesher* (1789).

During this time he continued studying for further historical plays, constantly trying to perfect a metric form suitable for Ger. drama. There was no example or model. He concentrated on the Fr. classics, but was finally forced to evolve his own pattern. On a short visit to Weimar (the duke was absent and Goethe was in Italy) he met the poets Herder and Wieland, and their advice was of some help to him. He eventually came to the little tn. of Rudolstadt, where he met the von Lengefeld family and fell in love with one of the daughters, Charlotte, whom he was able to marry in Feb. 1790 when, on the recommendation of Goethe, he became professor of hist. at the univ. of Jena. His studies for *Fiesco*, *Don Carlos*, and for later tragedies which he had already in mind, namely the *Wallenstein* trilogy (1798-99), *Mary Stuart* (1800); *Die Jungfrau von Orléans* (Joan of Arc) (1801); *Die Braut von Messina* (in anct. Gk. classic style with chorus, 1803); and *Wilhelm Tell* (1804), gave him an extensive knowledge of world hist., and his marked interest in international relations found expression in the famous first lecture at Jena Univ., *Was ist und zu welchem Ende studieren wir Universalgeschichte*. His historical studies convinced him that hist. could only be studied accurately when related with philosophy. He therefore studied intensively Kant, the most important philosopher of his time. This acquisition of a vast philosophical knowledge is reflected in his later prose works on art and aesthetics. In the years 1788 to 1800 he wrote *Das Lied von der Glücke* (the only example of a Ger. poem in epic, lyric, and didactic form) and his famous ballads.

As a philosopher S. did not evolve a new system, but in his works he brought philosophy (especially Kant and the Eng. philosophers Shaftesbury and Ferguson) nearer to the Ger. public. His firm belief in the possibility of an Ideal Man compelled him to portray, in all his works, ideal personalities as he saw them. In the later period of his life, at Weimar, his philosophy, certainly influenced by Goethe, became poetry again. During this time he wrote some very fine poems, e.g. *Die Künstler*, *Wurde der Frauen*, and the famous *Xenien* (first pub. in the *Weimar Museumnachr.*). The last years of his life were darkened by constant ill health but enlightened by his friendship with Goethe.

A first ed. of S.'s complete works was pub. 1812-15 and ed. by C. G. Körner. Of later eds. may be mentioned

the so-called *Sakularausgabe* (pub. in 17 vols. 1905). There are sev. eds. of letters between S. and Goethe, S. and Körner, S. and Charlotte and others. Eng. trans. of his works include Coleridge's trans. of the second and third parts of the *Wallenstein* trilogy (1800); *Poems and Ballads* by Sir E. B. Lytton (1844); *Minor Poems* by J. H. Merivale (1884); and an ed. of his works in Bohn's Library (1846).

The first life of S. was written by Carlyle in 1825. See lives and studies by K. Sinc, 1842; W. Lytton, 1845; H. Duntzer, 1881; Caroline von Wolzogen, 1876; H. Nevinson, 1889; J. Minor, 1890; C. Thomas, 1901; P. Carus, 1905; O. Gunther, 1925; H. Gysanz, 1934; W. Witte, 1949; and H. B. Garland, 1949. See also J. G. Robertson, *Schiller after a Century*, 1905; T. Raa, *Schiller's Dramas and Poems in England*, 1906; A. E. Murison, *Schiller's Wallenstein in English Verse*, 1931; F. Ewen, *The Prestige of Schiller in England, 1785-1959*, 1932; and K. Berger, *Die Balladen Schillers*, 1932.

Schipka Pass, see SHIPKA PASS.

Schipperke, small black tailless dog, native of Belgium, where it was principally used on barges as a guard and vermin killer. It is vivacious, courageous, dainty, and elegant, and has become very popular since its introduction into Britain about 1880. Its weight is from 12 to 20 lb.; its head is foxy, nose small, ears erect, and eyes small and dark brown. The body is short and thickset, the hind quarters muscular. The coat is dense but rather short, except round the neck and on the chest, while the backs of the thighs are feathered.

Schism (Gk. σχίσμα, a rent or division). The Gk. word is used sev. times in its literal sense in the N.T., and also occurs in its figurative and modern sense in sev. passages: John vii. 43, ix. 16, x. 19; Acts iv. 4, xiii. 7. It is mainly used to denote the act by which a certain number of Christians cut themselves off from the main body of the Church. In this sense the greatest S. in the hist. of the Church was the separation of the E. half under Photius and Michael Cerularius in the ninth and tenth centuries from W. Christendom. In spite of many efforts (e.g. at Florence in 1439) this has never been healed. The term 'great S.' however, is usually applied to the div. inside W. Christendom in the fourteenth century. On the return of the popes from Avignon to Rome in 1377, Pope Gregory XI. died, and the cardinals, afraid of the Rom. populace, hastily elected Bartolomeo Prignano, an It., as Urban VI. He proved himself a harsh master and a year later a number of the cardinals seceded and elected Robert of Geneva as pope, under the title of Clement III. What justification they had for this has never been made clear, but it effectually divided Christendom into two camps: France, Scotland, Savoy, Spain, and Portugal accepted Clement III., while Italy, England, Hungary, and the Holy Rom. Empire adhered to Urban VI. In time each party elected a successor, and the eccles. war continued for forty years. At last a general council was held at Pisa

In 1409, which set both popes aside and elected the Gk. cardinal of Milan as Alexander V. This only added to the confusion, but at length from the Council of Constance (1417) Martin V. emerged as sole pope, a position, however, much weakened in the eyes of Christendom. Thenceforward the hist. of the Church in the fifteenth century shows a struggle between pontiff and general council, the former trying with partial success to regain his lost authority. See L. von Pastor, *History of the Popes*, 1942; P. Hughes, *History of the Church*, vol. iii., 1948; and W. Ullman, *The Origins of the Great Schism*, 1949.

Schist, fine-grained foliated rock, crystalline in nature, which easily divides into thin lenticular sheets. The S. are metamorphic rocks, and occur in regions of great earth movement, such as the Scottish highlands and the Alps. In structure they are stratifolial (flaggy S.) or lenticular. Each variety is named after its dominant mineral, and thus occur mica S., garnet S., etc.

Schizanthus, Poor Man's Orchid, or Butterfly Flower, genus of ann. plants (family Solanaceae) with daintily coloured flowers often borne in great profusion. A number of species and varieties are grown in pots in the greenhouse for spring flowering, but *S. plumatus* and its varieties can be treated as hardy anns. The pollination mechanism is of interest; the stamens explode on contact and eject the pollen over the visiting insect.

Schizomycetes, see SCHIZOPHYTA.

Schizophrenia, term introduced by Bleuler in 1911 to describe all cases of functional mental disorder, with the exception of those typical of manic-depressive psychosis. He suggested that it should be used to designate the various types of case characterised by a splitting of the personality, i.e. splitting in the sense of fragmentation or disintegration. S. should not be confused with dual personality, which is a hysterical phenomenon of rare occurrence. S., in its typical form, usually makes its appearance during adolescence and presents a picture of slow steady deterioration of the whole personality, manifesting itself in disorder of thought, feeling, and conduct, and in an increasing inability to maintain contact with reality. See also INSANITY (CLASSIFICATION). See D. K. Henderson and R. D. Gillespie, *A Text-book of Psychiatry* (6th ed.), 1914, and Sir M. Craig and Thomas Benton, *Psychological Medicine* (4th ed.), 1926.

Schizophyta, subdivision of the Thallophytes, embracing the group of minute organisms familiarly known as Bacteria, and sometimes designated Schizomycetes or splitting fungi. Besides the characteristic method of multiplication by div., many species increase from spores. See BACTERIA.

Schlagintweit, name of a family of Munich brothers, five in number, all scientific explorers, or students of foreign countries. They were Hermann (1826-1882); Adolf (1829-57); Eduard (1831-1866); Robert (1833-55); and Emil (1835-

1904). Hermann, Adolf, and Robert worked chiefly together. The first two pub. two books on the physical geography of the Alps (1850-54), and subsequently Hermann, Adolf, and Robert pub. a further work on the same subject. They were then sent by the E. India Company to investigate scientifically the Doocan, Himalayas, Tibet, Assam, etc. Adolf met his death in E. Turkestan, but Hermann and Robert pub. *Results of a Scientific Mission to India and High Asia* (4 vols., 1860-66). Eduard fought in the Sp. expedition to Morocco (1859-60) and fell at Kissingen in 1866, after having written an account of the expedition. Emil wrote sev. learned works, including *Buddhism in Tibet* (1863); *Indien in Wort und Bild* (1881); *Die Könige von Tibet* (1881), etc.

Schlan, tn. of Bohemia, Czechoslovakia, 37 m. N.W. by W. of Prague. Near by is the health resort of Sternberg. Coal is mined in the vicinity. Pop. 12,000.

Schlangenbad, spa in Hesse, Germany, 5 m. W. of Wiesbaden. Pop. 510.

Schlegel, August Wilhelm von (1767-1845), Ger. orientalist and critic, b. at Hanover, and educated there and at Göttingen; brother of Friedrich S. (q.v.). In 1796, having already shown remarkable critical ability in an essay on Dante, he went to Jena, where he commenced his excellent trans. of Shakespeare's plays of which he pub. seventeen (1798-1810). At Jena, too, he collaborated with his brother in editing the *Jena Athenaeum*, and they were soon recognised as the leading spirits of Romanticism. In 1802 he went to Berlin, where he lectured and also pub. his Euripidean tragedy *Ion*, strangely enough a failure, like his brother's tragedy *Alarcos*, pub. the same year. He also produced splendid trans. into Ger. of Cervantes, Camoëns, Calderón, and sev. other foreign poets and dramatists. From 1804, having divorced his wife Karoline, who immediately married Schelling, he lived with Mme de Staël at Coppet, Geneva, except during 1813-14, when he was court secretary to the crown prince of Sweden. In 1818 he became prof. of literature at Bonn, where he remained until his death, publishing sev. contributions to the study of Sanskrit and also his *Kritische Schriften* (1828). His lectures on *Dramatic Art and Literature*, delivered at Vienna in 1808, were pub. in 1809-11 (Eng. trans. 1815). With his Shakespearean trans., they constitute his finest and most famous achievement. His collected works were ed. by E. Böcking in 12 vols., 1846-47. See W. Schwartz, *August Wilhelm Schlegels Verhältnis zur spanischen und portugiesischen Literatur*, 1911; A. Bessenbeck, *Kunstanschauung und Kunstlehre August Wilhelm Schlegels*, 1930; and monograph by F. von Brentano, 1944.

Schlegel, Karl Wilhelm Friedrich von (1772-1829), Ger. historian and literary critic, a brother of August S. (q.v.). b. at Hanover, and studied at Göttingen and Leipzig where a legal career in view, but classics and poetry proved more attractive. After a period as dozent at Jena, having pub. writings on Gk. and Sanskrit

literature, he lectured in Paris (1802), where he produced an ed. of Euripides. In 1809, having joined the Rom. Catholic Church, he became court secretary at Vienna, where he ed. *Concordia*, began the task of editing his writings for a collected ed., and delivered the lectures pub. subsequently as *Philosophie des Lebens* (1828; Eng. trans., 1847) and *Philosophie der Geschichte* (1829; Eng. trans., 1847), besides publishing the works *Über die Neuere Geschichte* (1811; Eng. trans., 1879) and *Geschichte der Alten und Neuen Literatur* (1815; Eng. trans., 1846). His *History of Literature* (1814; Eng. trans., 1859) and *Philosophy of History* (1827; Eng. trans., 1855) are also well known. His *Über die Sprache und Weisheit der Indier* (1808) formed the foundation of research on Indian philology. S., who shared with his brother the critical leadership of literary Romanticism, has been called the originator of the Romantic movement. His early writings in the Jena *Athenäum* are the chief exposition of its aims; his romance *Lucinda* (1799), of the same period, is interesting as presenting an ethical analogy of its artistic ideals. His wife Dorothea, whom he abducted, was a daughter of Moses Mendelssohn, and also achieved fame as a writer. His works were pub. in 10 vols., 1823-25, and in 15 vols. (incomplete, ed. E. Feuchterleben), 1846. See I. Rougé, *Schlegel et la genèse du Romantisme allemand*, 1904, and J. W. Schell, *Schlegel and Goethe*, 1906; J. Körner, *Romantiker und Klassiker: die Brüder Schlegel in ihrer Beziehungen zu Schiller und Goethe*, 1924.

Schleicher, August (1821-68), Ger. philologist, b. at Meiningen, became prof. of Slavonic languages at Prague and Jena (1850) and, in 1857, honorary prof. at Jena. His *Comparative Grammar of the Indo-Germanic Languages* (1871; Eng. trans. 1874-77) is a most distinguished work. He also wrote *Die Sprachen Europas* (1850); treatises on Lithuanian and Slavic tongues, and *Darwinism tested by the Science of Language* (Eng. trans. 1869). See life by S. Lefmann, 1870.

Schleicher, Kurt von (1882-1934), Ger. soldier and chancellor. A member of the Prussian nobility, he was appointed to the staff of the quartermaster-general in the First World War, and held staff posts throughout the war, afterwards joining the Reichswehr ministry, and there concentrating in his hands so many political threads that he became the recognised link between the army and the politicians. In 1929 he was made chief of the ministerial staff, a new post analogous to that of a permanent under-secretary in a Brit. Gov. dept. Major-general, 1929; lieutenant-general, 1931; minister of defence, 1932; in Dec. 1932 he became chancellor of Germany in succession to von Papen, but his gov. lasted only until Jan. 28, 1933, the hostility of Hitler and the Nazis involving his fall. President Hindenburg refused to authorise him to dissolve the Reichstag and appointed Hitler as chancellor, and S. then retired into private life. Together with his wife he was murdered during the Nazi purge of June 30, 1934, on the

assumption that he was involved in a conspiracy to overthrow Hitler. See also GERMANY, *History*. See H. Brauweller, *Generäle in der deutschen Republik*. Groner, *Schleicher, Sekt*, 1932.

Schleiermacher, Friedrich Ernst Daniel (1768-1834), Ger. theologian and philosopher, b. at Breslau, son of a Protestant army chaplain. He was educated from 1783 to 1787 at the Moravian schools at Niesky and Barby, and from 1787 to 1789 at the univ. of Halle. He became assistant minister in a church at Landsberg in 1794, and chaplain to the Charité Hospital, Berlin, in 1796. In the same year he joined the Romantic circle of Friedrich Schlegel at Berlin, where, after reading Plato, Spinoza, and Kant, he pub. *Reden über die Religion* (1799), in opposition to the prevailing rationalism and as an attempt to establish a new form of Christian religion in which Kant and Spinoza should be reconciled. His *Monologen* (1800) set forth his ethical ideals, developed later, that self-perfection is desirable as a step to collective social perfection; that, morally, good and reasonable are identical, as are bad and unreasonable; and that the sole standard of comparison of moral values is that of social necessity. Court preacher at Stolpe, Pomerania, 1802-4; after lecturing at Halle, 1803-6, he returned to Berlin, where he and Fichte led the formation, in 1810, of the univ. Here S. became prof. of theology, and his chief work, *Der Christliche Glaube*, appeared in 1821. An ed. of his Works (30 vols.) was pub. 1836-64. See W. Dilthey, *Aus Schleiermachers Leben in Briefe*, 1858-63; O. Ritschl, *Schleiermachers Stellung zum Christentum in seinen Reden über die Religion*, 1888; M. Fischer, *Schleiermacher*, 1899; T. Kappstein, *Schleiermachers Willkür*, 1921; T. Siegfried, *Kant und Schleiermacher*, 1931; and K. Barth, *Protestantische Theologie im neunzehnten Jahrhundert*, 1947.

Schleswig, or Slesvig, tn. and seaport. cap. of Schleswig-Holstein, once an important trading centre, 70 m. N.W. of Hamburg. It is picturesquely built, and has a fine twelfth-century cathedral recently restored. It is on the railway from Hamburg to Flensburg. Fishing, flour-milling, and tanning are the chief industries, but the former commercial importance of the tn., when in the thirteenth century it was the seat of the dukes of S., greatly declined long ago, largely on account of the successful rivalry of Lubeck. Pop. 21,100. See also next article.

Schleswig-Holstein, formerly N. prov. of Prussia, bounded N. by Jutland, W. by the North Sea, and E. by the Baltic. The N. half is Schleswig, and the S. half is Holstein, including in its S.E. corner the small dist. of Lauenburg. The surface is of a level character, with numerous lakes; the E. coast is deeply cleft with inlets, e.g. the fjords of Apenrade, Hadersleben, and Flensburg, and the bays of Eckernförde and Kiel; while the W. coast is uniformly low with marshland in the interior. Embankments protect the coast from the North Sea. There are no rivers of any importance, the Elbe, which separates

Schleswig from Holstein, being the prin.; but the Elbe flows along its S.W. frontier for about 70 m. Cattle and horse rearing and agriculture are the most important occupations, and large crops of cereals and potatoes are produced. The Frisian Is. lie along the W. coast, the chief being Sylt, Amrum, Föhr, Nordstrand, and Pellworm. The Kaiser-Wilhelm Canal runs through the prov., connecting the North Sea with the Baltic. Iron founding, shipbuilding, brewing, distilling, sugar refining, and the manuf. of tobacco and cloth were among the more important industries before the Second World War, particularly shipbuilding. The heavy bombing of Kiel, however, largely destroyed this last industry. Fishing is engaged in round the coast, Eckernförde being a great Ger. fishing centre. The chief exports were grain, horses and cattle, fish, and oysters. The commercial activity of the prov. was always much greater than the industrial. In the years following the Second World War S.-H.'s financial position became disastrous, through loss of trade, the prohibition of shipbuilding, and much diminished revenue from excise duties at the ports, added to which was the cost of supporting refugees and the war-disabled.

History.—Holstein was originally an independent prov., while the margraviate of Schleswig was annexed by Henry I., king of the Gers., in the tenth century. It was, however, ceded to the Dan. king, Canute the Great, by Conrad II. in 1032. Holstein also came under Dan. rule, and the two duchies remained annexed to the Dan. crown until the nineteenth century, when there appeared a prospect of the Dan. dynasty dying out. In this event the Ger. pop. of S.-H. hoped to set up their independent sovereignty under Duke Christian August of the Augustenburg line. King Frederick VI. of Denmark granted some concessions, and recognised the legal bonds between the two duchies, but after the accession of Christian VIII. the nationalist policy of the democratic Elder-Dan. party triumphed. Christian VIII. addressed an open letter, July 8, 1846, whereby the same law of succession was held to apply to Schleswig as to Denmark. Christian's successor, Frederick VII., proclaimed a common constitution for Denmark and S.-H. In 1848 the people of S.-H. revolted, and in their war of independence were aided by the troops of the Ger. Confederation. The Danes were defeated at Schleswig on April 23, but Britain and Russia were opposed to an extension of Ger. influence, and forced on the belligerents the treaty of Malmö. In 1849 S.-H. renewed the war, and the army, commanded by the Prussian general Barin, defeated the Danes at Kolding. But was severely repulsed at Fredericia. By the armistice, concluded at Berlin, Schleswig was separated from Holstein, and placed under a council, with an Englishman as president. Prussia made peace with Denmark, but in 1850 the Holsteiners continued the war on their own account. They were defeated at Idstedt on July 25, and the Ger. powers forced hostilities to cease, S.-H. being disarmed by Austrian

troops. By the London protocol of 1852 it was ordered that S.-H. should go without div. to Prince Christian of Glücksburg, heir to Frederick VII. Frederick died on Nov. 15, 1863, and Prussia and Austria united in preventing the incorporation of S.-H. in Denmark. Britain refused to support the London protocol single-handed, and the Prussian Army under Wrangel and Prince Frederick Charles, and the Austrian Army under Gabelentz, advanced against the Dannewerk, a 50-m. fortification across S. Schleswig from the R. Schlei on the E. to the marshes on the W. On Feb. 2, 1864, the Schlei was crossed, and the Dannewerk was surrendered. The Danes were pursued and defeated at Oeversee. They retreated behind the Düppel fortifications, beyond Flensburg, and were besieged by Prince Frederick. On April 18 the Prussians made a successful assault at the cost of some 2000 men. Fredericia was abandoned and England's mediation secured an armistice from May 12 to June 26. The Danes refused to partition S.-H. according to nationality, but, after a renewal of war, accepted a peace concluded at Vienna on Aug. 1 and signed on Oct. 30, 1864. Denmark ceded all claims to S.-H. to the emperor of Austria and the king of Prussia. Following the war between Austria and Prussia two years later (see SEVEN WEEKS WAR), S.-H. became part of Prussia, and remained thus intact until after the First World War, when in 1918 the Allies granted plebiscites in two zones in S.-H., and as a result the frontier was redrawn more in accord with nationality. That part of N. Schleswig, some 1520 sq. m., which was assigned to Denmark was renamed the S. Jutland Provs. After 1915 the rest of S.-H. became a *Land* or prov. of the Brit. occupation zone of Germany, with a pop. of 2,650,000.

A Schleswig problem for the Brit. authorities and Denmark was created after the influx of Ger. refugees from E. Prussia and Pomerania (i.e. Polish-occupied Germany). By the late autumn of 1946, for every fifty-five native inhab. there were forty-five newcomers, and in the whole of S.-H. there were then 1,524,000 native Gers. and 1,219,000 refugees. In Schleswig the N. *Land* of the region which Danes call S. Slesvig, 309,000 refugees were imposed on a native pop. of 300,000. In the whole Brit. zone of Germany there were over 3,000,000 refugees, and more than a third of them were crowded into S.-H. The refugees set a Ger. stamp on Schleswig just when many of its pop. had decided that they wanted to be quit of Germany and were looking again to Denmark, to which in racial kinship and sentiment they feel themselves bound. It was difficult to gauge the sincerity of their cry of 'Back to Denmark'; for round the Dan.-speaking pop. of 15,000 had grown a strong movement of people who spoke only Ger., but yet wanted to be regarded as Danes. This was the S. Schleswig Association, a body with a membership of 70,000, which could claim the support of a large part of the pop. See T. Lorentzen, *Schleswig-Holstein im Mittelalter*, 1925, and V. Pauls

and O. Scheel, *Geschichte Schleswig-Holsteins*, 1934.

Schlieffen, Count Alfred von (1833-1913), Ger. field-marshal, b. in Berlin. Distinguished in the Franco-Ger. war, 1871, and chief of the Ger. general staff, 1891-1905. He was a member of the Prussian Upper House from 1871. He greatly developed the Ger. Army manœuvres, and wrote much on military matters. His *Gesammelte Schriften* were pub. in Berlin in 1913. He wrote a paper on the battle of Cannæ (a famous example of encirclement by both wings), in order to support his favourite theory or detailed plan for the defence of Germany; and, at the same time, this one dominating idea of encirclement persisted in the Ger. leaders throughout the First and Second World Wars. The so-called S. plan was, indeed, implicit in the whole conception of the Ger. *Blitzkrieg* against first one foe and then the other. S. was a disciple of Clausewitz and von Moltke in the doctrine of so decisively defeating the enemy as to force him to fight on a reversed front, and then destroying him. His famous 'plan,' founded on the hypothesis that Germany was surrounded by potential enemies, was to select one enemy for decisive defeat and destruction, and then, manœuvring on interior lines, aided by a highly developed strategic railway system, to turn from the defensive to the offensive against the other enemy. His plan of action against France was partly followed in 1911, i.e. the heavier forces attacked in the W. while the lighter held the front against Russia. But in omitting to reduce and destroy the chain of Fr. forts from Toul or Belfort to Verdun, the Gers. never compelled the Fr. to fight on a reversed front, nor was there ever any question of their rolling up two flanks; the heavy right-handed lock on which the S. plan depended was weakened. But in the E. the basic idea of S.'s favourite theory was exemplified at Tannenberg in the concentrated attack against the Russian right flank (see further under TANNENBERG, BATTLE OF). In the Second World War the S. plan was strikingly carried out in the *Blitzkrieg* against Poland, followed in 1940 by that against the W. front; and then, in 1941, against Russia. See monographs by H. Rochs, 1921; W. Elze, 1928; and E. Bireher and W. Bode, 1937.

Schliemann, Heinrich (1822-90), Ger. archaeologist, b. at Neu-Buckow, Mecklenburg-Schwerin, travelled far and wide in early life. After struggling for a livelihood as a grocer's assistant, cabin boy, and clerk, acquiring meantime a knowledge of seven foreign languages, including anc. Gk., he amassed a huge fortune at St. Petersburg during the Crimean war as an indigo merchant. At Hisarlik he excavated the Mycenaean Troy, believing it to be the Homeric (see *Troy and its Remains*, 1875). At Mycenæ (q.v.) he unearthed the five shaft graves, his greatest find, and at Tiryns he laid bare the ground plan of a Mycenaean palace. In his monographs will be found the absorbing narrative of his excavations. See E. Ludwig, *Schliemann of Troy*, 1931 (Eng. trans.).

Schlüsselburg, tn. of the Leningrad Region, R.S.F.S.R., situated where the Neva leaves Lake Ladoga, 40 m. E. of Leningrad, Russia. The old fortress on the is. of Neva became a political prison. Heavily fortified at the time of the Second World War, it was a vital stronghold in the outer defences of Leningrad (q.v.). Pop. 8000. See also EASTERN FRONT OR RUSSO-GERMAN CAMPAIGN IN SECOND WORLD WAR.

Schmalkalden, tn. 19 m. S.S.E. of Eisenach, in Thuringia, Germany. The famous Protestant League of Schmalkalden was concluded in the Gothic tn. hall in 1531, and the house still exists, where, in 1537, Luther, Melancthon, and others framed the celebrated 'Articles of Schmalkalden.' Ironware was manufactured before the Second World War, and the tn. is a summer resort. Pop. 10,700.

Schmidt, Johann Friedrich Julius (1825-1881), Ger. astronomer, b. at Eutin, lived in Athens for most of his life as director of the national observatory there. He was very industrious in lunar researches, and produced a map of the moon based on nearly 3000 separate drawings. His observations in 1866 of the crater of Linné showed that change was noticeable on the face of the moon. It was S. who discovered Nova Cygni (q.v.), a nova which attained a maximum magnitude 3, on Nov. 24, 1876.

Schmitt Camera, see under TELESCOPE.

Schnabel, Artur (b. 1882), Austrian pianist and composer, b. at Lipnik. From 1889 to 1896 he studied at Vienna under Hans Schmitt, Leschetitzky, and Mandyzewski. He made his début at Vienna in 1890, and has since then appeared in all the prim. concert halls, and with all the most celebrated orchestras, of Europe and America. S. is reckoned as one of the great living exponents of the pianoforte works of Beethoven. He taught at the State Academy, Berlin, 1925-30, and lectured at the univs. of Berlin, Chicago, Michigan, and Manchester, where he received an honorary doctorate of music in 1933. S. is the author of *Reflections on Music* (1936) and *Music and the Line of most Resistance* (1942). His musical works include two symphonies, and he has ed. the pianoforte works of Mozart, Beethoven, and Brahms.

Schnauzer, or **German Rough-haired Pinscher**, is in structure a member of the terrier breed. It is a thickset dog, with a broad head and a powerful blunt muzzle. The shoulders are flat and sloping, and the chest is broad and deep. The eyebrows are bushy, the ears small, and the nose is black and full. The colouring is pepper and salt or black, and the height is from 17 to 20 in. at the shoulder. A sub-variety is the miniature S., standing from 12 to 14 in. at the shoulder.

Schneckenberger, Max (1819-49), see under 'WACHT AM RHEIN, DIE.'

Schneeberg, tn., 14 m. S.E. of Zwickau by rail, in Saxony, Germany. Lace, corsets, snuff, and colours, etc., are manufactured, and cobalt, bismuth, uranium, tin, and nickel are mined, besides silver. Pop. 9700.

Schneekoppe, highest point (5260 ft.) of the Riesengebirge, Germany, 8 m. S. of Hirschberg. It is the highest point in central and N. Germany, and has a meteorological station.

Schneidemühl, see **PILA**.

Schneider Trophy. International trophy for aviation valued at £1000, and presented in 1913 by Jacques S., a Fr. patron of aviation. It is open to seaplanes of all nations. There was no contest during the First World War. After 1927 the contest was held biennially. Winners: 1913, Prévost (Fr.), 45-75 m.p.h., at Monaco; 1914, Pixton (Great Britain), 86-8 m.p.h. at Monaco; 1920, Bologna (Italy), 107 m.p.h., at Venice; 1921, Briganti (Italy), 111 m.p.h., at Venice; 1922, Biard (Great Britain), 115-7 m.p.h., at Naples; 1923, Ittchenhouse (U.S. Navy), 177-88 m.p.h., at Cowes; 1925, Lt. Doolittle (U.S.A.), 232-57 m.p.h., at Baltimore; 1926, Maj. de Bernardi (Italy), 246-49 m.p.h., at Hampton Roads; 1927, Fl./Lt. Webster (Great Britain), 281-65 m.p.h., at Venice; 1929, F.O. Waghorn (Great Britain), 328-63 m.p.h., at Southampton; 1930, no race; 1931, no race, but Fl./Lt. Boothman (Great Britain), at Southampton, completed the course at average speed of 310-08 m.p.h., a record for the race; while Fl./Lt. Stainforth, Sept. 13, set up a new world's record averaging 379-05 m.p.h. for 3 km. straight flight and doing one circuit at over 385 m.p.h. The S. T. now belongs to Great Britain. There have been no contests since 1931. The winning Brit. planes in 1922, 1927, 1929, and 1931 were designed by R. J. Mitchell (*q.v.*). See also **AERONAUTICS**.

Schnitzer, Edward, see **EMIN PASHA**.

Schnitzler, Arthur (1862-1931). Austrian dramatist and novelist, b. in Vienna, the son of a physician. S. himself studied medicine, graduating in 1885, and from 1886 to 1888 he was second physician to the general hospital in Vienna. In 1893 his first pub. work appeared, *Analot*, a series of one-act episodes round the typically Schnitzlerian character of the aristocratic philanderer. Two years later his most celebrated play, *Lübeck* (Eng. *Playing with Love*; literally 'flirtation'), was produced in Vienna. This play is the tragedy of a flirtation, whereas *Analot* is the comedy. Most of S.'s plays and novels are concerned with the analysis of love and the presentation of passion. The play, *Reigen* ('A Round Dance,' 1900), is a series of ten erotic meetings with interchangeable couples, and is written with almost medical detachment. It created somewhat of a scandal when it was performed in 1920, against the author's will. The physician in S. and his psychological penetration forbid any sentimentality, and he equally eschews sensuality, preferring an atmosphere of Viennese refinement.

Works of S. trans. into Eng.: *Plays: The Green Cockatoo and other plays* (1913); *Playing with Love* (1914); *Gallant Cassian* (1914); *Dr. Graesler* (1924); *Professor Reinhardt* (1927). Novels: *The Road to the Open* (1913); *Casanova's Homecoming* (1922); *Fräulein Else* (1925); *Rhapsody* (1928); *Little Novels* (1929); and *Theresa*

(1929). See lives by A. Salkind, 1907; J. Kapp, 1912; J. Körner, 1921; H. Specht, 1922; and S. Iptzin, 1932.

Schnörkel Air-tubes, see under **SUBMARINE**.

Schnorr von Carolsfeld, Julius (1794-1872), Ger. artist, b. at Leipzig, began to attend the Academy of Vienna in 1811, but in 1818 migrated to Rome, where he joined the band of Ger. Pre-Raphaelites. With Cornelius, Overbeck, and Velt he painted frescoes for the Villa Massimo, his share being illustrations from Ariosto's *Orlando* (1820-25). From 1827 to 1846 he worked at Munich for King Ludwig of Bavaria, adorning five halls of the new palace with scenes from the *Nibelungen-lud*, and three other royal apartments, called the Fest-saalbau, with encaustic paintings recalling the bists. of Charlemagne, Rudolf of Hapsburg, and Barbarossa. In England he is chiefly known for his florid but original designs for the *Bibel in Bildern*, or *Pictorial Bible* (1852). He wrote *Stufe aus Italien, künstlerische Wege und Ziele* (1817-27). See study by H. W. Singer, 1911.

Schoenberg, Arnold, see **SCHÖNBERG**.

Scholasticism, term of wide meaning applied to the general theological and philosophical system of the Middle Ages. The early fathers of the Church had left a vast 'occasional' literature of theology, apologetical and exegetical. It was the mission of S. to produce an orderly synthesis of this traditional doctrine (scholastic theology) and to correlate it with a separate system of truths based on reason (scholastic philosophy). Whilst the most prominent feature of S. was its function as a systematiser and rationaliser of religious dogma, its philosophic activity was marked by an almost entire reliance on the *a priori* or deductive method. Albert the Great (1206-80) and Thomas Aquinas (1226-1274) were also masters of the physical sciences as they were understood in their day, but the spirit of the age was almost entirely absorbed in abstract thought, though there were exceptions, such as the famous Roger Bacon (1219-91) (*q.v.*). Hence S. as a movement developed almost entirely on logical and abstract lines, and the later schoolmen were denounced for spinning out distinctions of a more or less fruitless nature. John Scotus Erigena (*d.* 877) is often called the founder of S., in so far as he was the first to attempt an independent system of philosophical speculation, but as he was heading straight for pantheism, he found no followers. The era of S. definitely opened when Roscelin's (*d.* 1100) application of nominalism (*q.v.*) to the Trinity called forth a restatement of realism from Anselm (1033-1109). This gave rise to the great question of universals: is there any reality underlying the idea of, say, man, in general, distinct from any individual man? William of Champeaux (1070-1121) asserted it; Abelard (1079-1142), des., a his rationalising theology, seems to have pointed the way to the moderate realism later generally adopted. Meanwhile Aristotelian philosophy was

gradually displacing Christian Platonism, but, the source-books having been adulterated by 'Arabian' translators and commentators such as Avicenna and Averroes, it was only recognised as quite 'safe' after Alexander of Hales (d. 1245) and Albert the Great (d. 1276) had purged it of rationalism. Hylomorphism was universally adopted; i.e. all corporeal things are composed of a possible element, matter, and an active principle, form, corresponding to the body and soul in man. This theory was extended by analogy to spiritual beings and artefacts. God was pure act, or form without potentiality. Meanwhile traditional theology had been finally disentangled from the philosophy which interpreted it, and Peter Lombard's (d. 1160) *Book of the Sentences* became the classical theological text-book until the *Summa Theologica* of Thomas Aquinas (d. 1274) took its place. The most gifted opponent of Aquinas was the Eng. Franciscan, Duns Scotus (d. 1308), the most subtle of all the medieval schoolmen. Nevertheless, scholastics were afterwards divided into Thomists and Scotists (q.v.). The last great name in S. is William of Ockham, a Scotist (d. 1308), who inclined towards scepticism and reintroduced nominalism. The Sp. schools of the seventeenth century failed to renew the glories of medieval S. But since the end of the last century a remarkable revival of S. has taken place, especially in Rom. Catholic univs. The work of Cardinal Mercier at Louvain is well known. Among other writers we may refer to M. Grabmann of Munich, J. Gredt and F. R. Garrigou-Langrange at Rome, R. D. Serfllanges and J. Maritain in France, F. A. P. Arévalo and M. C. D'Arcy in England. See M. de Wulf, *Histoire de la philosophie médiévale*, 1909, 1934-47; J. Rickaby, *Scholasticism in Philosophies Ancient and Modern*, 1911; W. H. Reade, *Philosophy in the Middle Ages*, 1926; E. Gilson, *L'Esprit de la philosophie médiévale*, 1932, 1941.

Scholes, Percy Alfred (b. 1877), Brit. musicologist, b. at Leeds. Former music critic of the *London Observer*, also of the *London Evening Standard* and of the Brit. Broadcasting Corporation (being music editor of the *Radio Times*), he was inspector of music in schools to London Univ. and also inspected for the Board (now Ministry) of Education. He has been extension lecturer at Oxford, Cambridge, Manchester, and London Univs. The admirable *Oxford Companion to Music*, which he ed., was first pub. in 1938. Other pub.: *Listener's History of Music* (1930); *Listener's Guide to Music* (1933); *The Puritans and Music in England and New England* (1934); *God save the King: its History and its Romance* (1942); *The Mirror of Music, 1844-1944* (1944); and *The Great Doctor Burney* (1948).

Scholasts are anct., chiefly anonymous, grammarians who annotated the classical texts, putting their remarks or *scholia*, for the most part, in the margin.

Schomburgk, Sir Robert Hermann (1804-1865), Anglo-Ger. traveller, b. at Freiburg in Prussian Saxony. Having reported on

his survey of Anegada, one of the Virgin Is. group, he was sent by the Royal Geographical Society to explore Brit. Guiana (1835), which he describes in his *Description of British Guiana* (1840), and *The Natural History of the Fishes of Guiana* (1843). He wrote also *History of Barbadoes* (1847) and ed. Raleigh's *Discoverie of Guiana in the Hakluyt series*, No. 3 (1848). He drew the 'S. line' frontier between Brit. Guiana, and Venezuela and Brazil (1841-43); and he was the discoverer of the *Victoria regia* lily.

Schönbein, Christian Friedrich (1799-1868), Ger. chemist, b. at Metzingen, Württemberg. He became prof. at Basel in 1828. In 1839 he discovered ozone, and in 1845 invented gun-cotton, from which he obtained collodion. See lives by J. J. Berzelius, 1900, and J. Liebig, 1900.

Schönberg, Arnold (b. 1871), Austrian composer and theorist. B. and studied in Vienna. He was helped by Zemlinsky in his struggling years. His early work, tinged with Wagnerian idiom, showed signs of strong originality, such as *Resplendent Night* (*Verklärte Nacht*, 1899) and choral-orchestral songs, corresponding to the post-impressionist movement in pictorial art (S. was also an accomplished painter), and by the beginning of the twentieth century two more important works, a ballad-cycle (*Gurrelieder*, and the symphonic poem *Pellás und Melisande*, had been performed and had created a considerable impression. His *Gurrelieder* secured him the award of the Liszt fellowship and a place on the staff of the Stern conservatory in Berlin. His individuality was shown in the poem-cycle, *Pierrot lunaire* (1912), and *The Lucky Hand*, a musical drama (1913). S. was still almost unknown to the general public, though he was the centre of a small band of disciples who accepted all his musical utterances with extreme reverence. During the vogue for modern music which followed the end of the First World War, it seemed time that S. should play a prominent part, and his important works rapidly became better known; but a certain 'purism,' amounting almost to asceticism, in his artistic outlook and his uncompromising personality seemed to prevent S. from ever finding wide popular acceptance. His influence on modern music, however, is of unquestioned importance, and in addition to the works mentioned above, he has pub. many songs, chamber music of various combinations, etc., and also an important *Manual of Harmony* (*Harmonielehre*) (first pub. 1911, revised ed. 1922). Being of Jewish descent and modernistic artistic tendency, he was driven out of Nazi Germany and migrated to America. See studies by A. Berg and others, 1912, and E. Wellesz, 1921; also D. Newlin, *Bruckner, Mahler, Schönberg*, 1947. See also ATONALITY.

Schönberg, see SUMPERK.
Schönbrunn, summer residence of the former Austrian royal family, in the S.W. of Vienna. Here a treaty with France was signed on Oct. 14, 1809.

Schönebeck, tn. of Saxony-Anhalt, Germany, on the Elbe, 8 m. S.S.E. of Magdeburg. It manufs. salt, chemicals, and machinery. Pop. 35,100.

Schöneberg, residential suburb, S.W. of Berlin, Germany, noted for manufs. of chemicals, paper, railway plant, and cigars.

Schönfeld, Eduard (1820-91), Ger. astronomer, b. at Hildburghausen, Meiningen, improved and greatly extended the catalogue of 321,198 stars made by Argelander (1799-1875). S. added a further 133,659 stars, including a large part of the previously neglected southern hemisphere.

Schongauer, Martin (c. 1415-91), Ger. painter and engraver, b. at Colmar, Alsace, or at Augsburg, was the greatest Ger. artist of the fifteenth century. The 'Madonna of the Rose-arbour' (1473) is the finest of his paintings. A collection of his engravings is in the Brit. Museum. See H. Wendland, *Martin Schongauer als Kupferstecher*, 1907, and A. Giroult, *Martin Schongauer et l'art du Haut-Rhin*, 1911.

Schoodic Lakes, chain of lakes forming part of the boundary between New Brunswick and Maine, U.S.A.

Schools, see ADULT EDUCATION; CO-EDUCATION; 'CO-MUNICATING' SCHOOLS; EDUCATION; FOLK HIGH SCHOOLS; PUBLIC SCHOOLS; SCHOOLS OF ART; SCHOOLS OF MUSIC; and the separate articles on various schools.

Schools, Approved, see CHILDREN ACTS and under REFORMATION AND INDUSTRIAL SCHOOLS.

School Boards, see under EDUCATION.

Schools, Brothers of the Christian, see CHRISTIAN BROTHERS.

Schools of Art, academies in which the pupils receive a systematic training by certified teachers to fit them for the profession of art. The first of the kind in England were founded by Sir Godfrey Kneller (1711), Sir James Thornhill (1724), and Wm. Shipley in St. Martin's Lane, all these being superseded by the schools instituted by the Royal Academy (1768). In 1837 a normal school of design was opened under gov. supervision at S. Kensington. In 1852-53 this was reorganised as a 'dept. of science and art,' passing from the management of the board to that of the Council on Education in 1856. The change involved in the incorporation of the science and art depts. with the Board of Education led to a reorganisation of the Royal College of Art. A special council of advice on art matters was appointed, consisting of representatives of painting, sculpture, architecture, and design who dealt with the Royal College of Art, and appointed the prof. to control the teaching in the classes.

By 1932 there were some 200 art schools in the United Kingdom. In London the Royal Academy Schools are still of great importance. They provide selected students in painting, sculpture, and architecture with free tuition and also award travelling scholarships. The Slade School of Drawing, Painting, and Sculpture, Univ. College, Gower Street, W.C., is

another notable London art school, and the Slade lectures on the fine arts are delivered at the univs. of Oxford and Cambridge. There are a number of art schools in London where commercial and applied arts may be studied. Among the most important is the L.C.C. Central School of Arts and Crafts, Southampton Row, W.C. This school was founded in 1896 in order to maintain anct. traditions and encourage modern developments in design and craftsmanship as applied to Brit. handicrafts and industries. It is intended primarily for the education of art and craft workers, and silversmith's work, textile, furniture, and book production are among the subjects taught. The Polytechnic School of Art, 307 Regent Street, W., is a more general school, and here a good training in commercial art, such as advertisement and fashion drawing, may be obtained. The City and Guilds of London Institute has depts. of art, while the Royal School of Needlework, Kensington, and the School of Woodcarving, 39 Thurloe Place, S. Kensington, give specialised courses in art. Art students in London may also obtain permission to paint in the various galleries. There are univ. art schools at London, Oxford, Reading, Durham, and Aberystwith.

In the provs. there are a number of art schools. Most public and secondary schools have an art school or art dept., and the National Society of Art Masters exists to further the interests of art education. The dominions overseas possess art schools in the prin. ins., and there is a Brit. school in Athens for the study of Gk. archeology, which includes Gk. art, and a Brit. school in Rome.

In the U.S.A. are the Boston Museum of Fine Arts, which possesses an art school, the Pennsylvania Academy of Fine Art in Philadelphia, and the Art Institute of Chicago. The National Academy of Design, 109th Street, New York, is somewhat similar to the Royal Academy. Other art schools in New York are the Grand Central School of Art, Grand Central Terminal, and the Art Students' League of New York, 215 West 27th Street. Among the most renowned art schools in the world is the Académie des Beaux Arts, Paris. The Académie exists for painters, sculptors, and musicians. Its various depts. were founded by Mazarin and Colbert, but were united into a whole in 1795. In Paris also numerous studios are to be found where the students may study, such as L'Atelier de la Grande Chaumière. Other cities on the Continent possessing great art galleries, such as Florence and Munich, also offer opportunities for the study of art. See also BEAUX-ARTS INSTITUTE OF DESIGN.

Schools of Music. The earliest S. of M. were eccles. institutions for teaching the traditional plainsong of the Church. That at Rome is reputed to have been estab. in the fourth century, and it is certain that St. Gregory the Great developed the system in the sixth century. Under Charlemagne S. of M. were founded from Rome at Aix-la-Chapelle and at the

monastery of St. Gall in Switzerland. In England the study of plainsong dates from the mission of St. Augustine (397), and the monasteries of Canterbury and Wearmouth soon became famous schools of the chant. During the Middle Ages S. of M. were estab. in connection with all the prin. abbeys and cathedrals; the existing choir school at York Minster can be traced back to 627. In the modern sense S. of M. are institutions where a complete musical education in every branch is available. They are derived from the It. orphanages (*conservatorio*) of the sixteenth century, notably that at Naples (1537) where children were trained as musicians. The earliest of the *conservatoires* outside Italy is that of Paris. It was not, however, until the foundation in 1822 of the Royal Academy of Music that S. of M. began to flourish again in England. Since then they have become numerous in all the prin. cultural centres of Europe and America.

Schooner, name given to a fore-and-aft rigged vessel, generally with two masts. There are two varieties, the ordinary fore-and-aft S. and the topsail S., which has a square topsail on the main-mast.

The term is also applied to a large drinking-glass.

Schopenhauer, Arthur (1788-1860), Ger. philosopher, b. at Danzig of wealthy parents. He studied at the univs. of Göttingen and Berlin, where he worked under Fichte, and in 1813 he took his Ph.D. at Jena Univ. From 1814 to 1818 S. lived in Dresden, and there began work on a philosophical system of his own. His main work, containing his philosophical system, is *Die Welt als Wille und Vorstellung* (*The World as Will and Idea*), pub. in 1819 (first Eng. trans. 1883 by Haldane and Kemp). This work is in four books, and is based upon a former work by S., pub. in 1814, and entitled *Über die vierfache Wurzel des Satzes vom Zureichenden Grunde* (*The Fourfold Root of the Principle of Sufficient Reason*). The main work cannot be fruitfully studied without first having mastered the *Fourfold Root*, and also demands some knowledge of Plato and of Immanuel Kant and his system. S. as a philosopher is a metaphysical thinker. His system belongs to the realm of idealism, though based on Kant's theory of perceptibility; but he is opposed to his predecessors in idealism, i.e. Fichte, Hegel, and Schelling.

Kant's manifold categories are formed into a single category of the subject. The world as a whole can be perceived in its effects on the subject, and the subject manifests these effects by the will. The will, therefore, is independent of time and space. It is *das Ding an Sich* (the matter in itself). The will is a compelling force without reason in the organic as well as in the inorganic. This force manifests itself as the will to live. S.'s system is a philosophy of pessimism. The subconscious will, striving to realise itself in an independent existence, is for ever frustrated; and hence arise pain and sorrow. From these there is no escape, unless through the arts, ethics, aesthetic,

and religion, all forms of idealism. The mediator between mankind and this idealism of life is the human genius. S.'s goal is universal pity, having achieved which, personal will is annihilated, and the world of appearances becomes a world of non-existence. Here we are very near to E. philosophies, especially Buddhism. In the W. the system issues logically in the Führer-cult. It can be understood that when his work appeared it was not popular, even with philosophical students. It was not before 1851 when Julius Frauenstadt wrote his *Briefe über die Schopenhauersche Philosophie*, that S. became better known, and with the end of the nineteenth century and the beginning of the twentieth when pessimism became a general trend of the time, S.'s system was widely accepted. In Germany a society, *Die Schopenhauer Gesellschaft*, was formed in 1911.

It is certain that S.'s influence has been great: for instance, on Nietzsche, and especially on musicians such as Richard Wagner, and, later, Hans Pfitzner. The influence of S.'s metaphysic is also apparent in Hardy's epic-drama *The Dynasts*. Of S.'s successors in philosophy Eduard von Hartmann was the most important. It is significant that the Gers., after having lost both wars of this century, and seeking new gods, religions, or values of life, have turned to either Buddha or S., or both. In 1947 S.'s *Aphorismen zur Lebensweisheit* was re-published in Germany as *Gedanken zur Lebensweisheit*. See also PESSIMISM.

A first ed. of S.'s works in six vols. was pub. by J. Frauenstadt in 1875. Since then there have been many reprintings, and the Ger. publisher Reclam produced a cheap and very useful ed. in six vols. See lives and studies by O. Busch, 1878; E. B. Bax, 1900; T. Whittaker, 1909; M. Kelly, 1910; P. Paulson, 1926; H. Zimmern, 1932; T. Mann, 1939; and F. Copleston, 1946. See also the critical ed. by P. Deussen (18 vols.), 1911.

Schoten, Belgium tn. 5 m. N.E. of Antwerp, situated on the old Kempen Canal. It has manufs. of silk and sugar. Near by are numerous castles. Pop. 16,900.

Schottische (Ger. form of *Scottish*), form of polka, danced to music in 2 time, was introduced into England about 1850 under the name of *Der schottische Tanz*. The Highland S., a kind of a fling, is danced to strathspey tunes.

Schreckhorn (peak of terror), one of the loftiest of the Swiss Alps, having an altitude of 13,386 ft., is in the Bernese Oberland, between the Finsteraarhorn and the Wetterhorn. It was first climbed in 1861 by Sir Leslie Stephen.

Schreiber, Lady Charlotte Elizabeth, see GUEST, LADY CHARLOTTE.

Schreiner, Olive (1859-1920), S. African authoress, b. in Beaufortland. She was the daughter of a missionary, and married Mr. S. C. Cronwright (who took her surname of Schreiner) in 1894. Her works include *The Story of an African Farm* (1883), written under the pseudonym of Ralph Iron; *Dreams* (1890); *Dramatic*

and *Real Life* (1893); *Trooper Peter Halket of Mashonaland* (1897); and *Woman and Labour* (1911). Three novels pub. after her death are *Thoughts on South Africa* (1923); *From Man to Man* (1926); and *Undine* (1928). She was well known by contemporaries as a publicist, and showed a remarkable perception of S. African problems, which was well in advance of her time. She was an early champion of women's rights, and her writing, as her life, was distinguished by its energy, candour, and crusading vigour. See life by S. Cronwright-Schreiner, 1921; also Vera Buchanan-Gould, *Not without Honour: the Life and Writings of Olive Schreiner*, 1918.

Schreiner, William Philip (1837-1918), S. African politician and barrister, b. Herschel dist., Cape Prov., son of a Ger. missionary, and brother of Olive S. Educated in Cape Colony, Cambridge Univ., and London, in 1893 he joined Cecil Rhodes's ministry as attorney-general, and in 1898 he was nominal head of a ministry which was under the virtual control of Hofmeyer. His mixed Ger.-Eng. nationality and rather narrow sympathies with the Dutch, with whom he was connected by marriage only, rendered his role no easy one, and in the days immediately preceding the outbreak of the S. African war, his ambiguous utterances on the appropriate attitude that should be adopted by the Cape Gov. necessarily led Kruger and Steyn to believe that the Cape Gov. would remain neutral in the event of hostilities with Great Britain. His ministry having for these reasons come to a very natural end, he dropped out of politics for some years, but in 1914 was high commissioner for the Union in London.

Schreyer, Adolf (1828-99), Ger. painter, b. at Frankfurt-on-Main. He travelled much in the E., and lived for some years in Paris. He marched with the Austrian Army across the Wallachian frontier, and was, perhaps, at his best in painting horses, and camp and battle scenes.

Schrödinger, Erwin (b. 1887), Austrian physicist, b. in Vienna, famous for his work on atomic structure and its interpretation in terms of wave mechanics; for this he shared with P. A. M. Dirac the 1935 Nobel prize for physics. He occupied successively the posts of prof. of physics at Jena and Stuttgart (1920), Breslau (1921), Zürich (1921), and Berlin (1927). He left Germany in 1933, and became a fellow of Magdalen College, Oxford, and in 1939 founded the School for Advanced Studies in Dublin, of which he became director.

Schubart, Christian Friedrich Daniel (1739-91), Ger. poet, b. at Obersonthelm, in Swabia. Educated at Erlangen, he became organist at Geislingen and afterwards at Ludwigsburg, but was obliged to leave the country on account of the blasphemous parodies he wrote. In 1777 his satirical poems led to his imprisonment at Hohenasberg. After his release (1787) he became manager of the theatre at Stuttgart. His works include *Deutsche Chronik* (1774-78), *Sämtliche Gedichte* (1785-86), and an autobiography, *Schubarts Leben*

und *Gedinnungen* (1791-93). See lives by G. Hauff, 1885; E. Nägele, 1888; and T. Jäger, 1913.

Schubert, Franz (Peter) (1797-1828), Austrian composer, b. in Vienna, was the son of a schoolmaster who cultivated music in his household. He began to learn the piano and violin early, and received lessons from Michael Holzer at the age of nine, learning also the organ and counterpoint. Admitted to the seminary for choristers in the imperial chapel in 1808. S. played the violin in the orchestra there, and sometimes conducted as deputy. At thirteen he wrote a fantasy for piano-forte duet and sketched other works, and in 1811 composed his first song. He played the viola in the string quartet at home. His mother died in 1812 and the



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father married again in 1813, when S. wrote his first symphony, and left the seminary, continuing his studies under Salieri. At seventeen he became assistant teacher in his father's school but disliked teaching; he wrote the song *Margaret at the Spinning-Wheel* from Goethe's *Faust* that year, and set to music the same poet's *Der König* in 1815, also writing the G major Mass, his second and third symphonies, and sev. dramatic pieces. In 1816 he left the school and joined his friend Schober in rooms, gathering a circle of literary and artistic rather than musical friends round him, and in 1817 meeting the singer Michael Vogl, who took a great interest in his songs and succeeded in getting his play with music, *The Twin Brothers*, produced in June 1820. His reputation grew beyond his own circle, but publishers failed to recognise him until his friends had twenty songs pub. at their own expense in 1821. He lived in Vienna all his life, except for some summe. excursions and two visits to Hungary as domestic musician to the Esterházy family on their country estate at Zselitz in 1818 and 1824. He never

held an official appointment and failed to stabilise his financial position, but earned enough casually to lead a modest if improvident and bohemian existence. His industry was phenomenal, for although he died at thirty-one he left more music than almost any other master. His death was due to typhus. With his contemporary Beethoven, S. represents the classical school of Haydn and Mozart projected into the Romantic period, but he composed with greater facility than did Beethoven, and in melody is about the equal of Mozart. His works include the operas *Des Teufels Lustschloss* (1814); *Alfonso und Estrella* (1821-22); *Pierrabras* (sic) (1823); *Die Verschworenen* (*Der hussitische Krieg*) (1823); operettas: *Die Freunde von Salamanka* (1815); *Fernando* (1815); *Der Spiegelritter* (1815); *Der vierjährige Posten* (1815); *Die Zwillingbrüder* (1819); melodrama: *Die Zauberharfe* (1820) and incidental music to *Rosamunde* (1823). S. also wrote masses and other church music, symphonies, sonatas, chamber music, and over 600 songs, etc. His composition was consciously disciplined, the style of much of the phrasing being severe, though he was able also to write brilliant music of a superficial character, and to mould popular Viennese themes into his most solemn works. S.'s work is always sincere, and this enabled him to achieve a purity and solemnity and rarity of style and mood which shows to perfection in his songs.

See study by H. K. von Hellborn (Eng. trans. 1869, with a chapter by Grove); lives and studies by N. Flower, 1928; K. Kobald (Eng. trans. 1928); C. W. Wilson, 1929; R. Bates, 1931; E. Duncan, 1934 (*Master Musicians*); A. Hutchings, 1945 (*Master Musicians*); and O. E. Deutsch (Eng. trans. by E. Blom, 1946). See also O. E. Deutsch, *Complete Thematic Catalogue of the Works of Franz Schubert*, 1950.

Schuchardt, Hugo (1842-1927), Ger. philologist, b. at Gotha, and educated at Jena and Bonn. He was lecturer on romance philology at Halle, 1873, and Graz, 1876-1900. He wrote *Ritornell und Tertze* (1874); *Romanisches und Keltisches* (1886); *Baskische Studien* (1893); *Wellsprache und Wellsprachen* (1894); *Sprachursprung* (1919-20); and *Der Individualismus in der Sprachforschung* (1925).

Schudy, Gilles, see Tschudi, Egidius.

Schuhplattler, courtship and love dance of the Bavarian and Austrian alps, in 3-4 time. Its chief feature is its turning and leaping figures, in which the dancer, among other movements, slaps his thighs, buttocks, and knees in time with the music, which is of the *Ländler* or slow waltz type.

Schulze-Delitzsch, Franz Hermann (1808-83), Ger. philanthropist, b. at Delitzsch, in Prussian Saxony, he studied law at Leipzig and Halle. He sat in the National Assembly at Berlin in 1848 as representative of the tn. of Delitzsch. S. founded a number of co-operative societies in Germany. His *Cours d'économie* (1874) has been trans. into more than one language. His other

works include *Soziale Rechte und Pflichten* (1867), and *Die Entwicklung des Genossenschaftswesens in Deutschland* (1870). See CO-OPERATION.

Schumacher, Kurt (b. 1895), Ger. social democrat leader, b. at Kulm, W. Prussia. From 1924 to 1931 he was a deputy in Württemberg Parliament, from 1930 to 1933 in the Reichstag. He was arrested in 1933, and spent eleven years in concentration camps. In 1945 he reorganised the Ger. Social Democratic party (S.P.D.), and in 1949 became leader of the opposition in the W. Ger. Parliament.

Schumann, Clara Josephine (1819-96), née Clara Josephine Wieck, daughter of the great piano pedagogues, Friedrich Wieck, and wife of Robert S. One of the most accomplished pianists of her day, she was largely responsible for the world's knowledge of her husband's compositions. She was also herself no insignificant composer of piano music and songs. She taught at Frankfurt Conservatorium, 1878-92. See life by B. Litzmann, 1902-8, 1920-25.

Schumann, Robert Alexander (1810-56), Ger. music critic and composer, 'the spirit of musical Romanticism,' b. at Zwickau, Saxony, son of a bookseller and publisher. He began to learn the piano-forte from a schoolmaster and organist at the age of eight, and played well by the time he was eleven, besides studying all the music found at his father's shop, where he also developed a literary taste. He played at school concerts and private houses, and made such progress in improvisation and composition that in 1825 Weber was approached to teach him, but could not, being busy preparing *Oberon* for London and expecting to go there. His father died in 1826, and in 1828 he was sent to Leipzig Univ. to study law. There he met Wieck, from whom he took piano-forte lessons, neglecting his legal studies, as he did again when in 1829 he moved to Heidelberg Univ., where he came under the influence of Thibaut. Back at Leipzig in 1830 he lodged at Wieck's house, wrote his first pub. works (Opp. 1 and 7), and the next year went to the St. Thomas cantor, Weidlich, for instruction, but left him for the younger Dorn. In 1832 he permanently injured his hand by a mechanical contrivance he had invented for finger-development and thus had to give up a pianist's career for that of a composer. With a circle of young intellectuals he founded the *Neue Zeitschrift für Musik* in 1833, the circle calling itself the 'Davidbündler.' He fell in love with Ernestine von Fricken in 1834, but the engagement was broken off in 1835. In 1836 Wieck's daughter Clara, already a remarkable pianist, was seventeen, and she and S. fell seriously in love. The father violently opposed a match, and in 1839 they took legal proceedings against him; he failed to yield, but they married on Sept. 12, 1840, the day before she came of age. In 1843 S. suffered a crisis of mental exhaustion, and he had a more serious breakdown after a tour in Russia with Clara in 1844, at the end of which year they settled at Dresden. Although his nervous complaint grew more marked

after periods of recovery. In 1850 he accepted the conductorship at Düsseldorf, including subscription concerts, choral practices, and church music, a post for which he proved quite unfit. The committee tactfully suggested his resignation in 1852, but with Clara's injudicious support he obstinately refused to withdraw. Signs of a mental collapse grew more and more alarming, and his creative work progressively less convincing, and on Feb. 11, 1854, he threw himself into the Rhine. On being rescued he was sent at his own request to a private asylum at Endenich, where he died more than two years later. As a composer he excelled in the art-song and in pianoforte compositions, which include the famous piano concerto, Op. 51, and two sonatas, Opp. 11 and 22, equally



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remarkable for their new forms. The piano quintet and quartet are the best known of his chamber music, which includes string quartets, piano trios, and violin sonatas. He left also an opera, *Genoëra* (1848), four symphonies, and other choral and instrumental music. See lives by J. W. von Wasilewski, 1858; A. Reisman, 1865; P. Necks (ed. by Christina Necks), 1925; J. A. Fuller-Maitland, 1923; H. Bedford, 1925; and Joan Chissell, 1948. See also K. Storck (ed.), *Letters of Robert Schumann*, 1907, and Sir C. H. Parry, *Studies of Great Composers*, 1922.

Schuschnigg, Kurt von, Austrian statesman, b. 1897 at Riva, S. Tirol. Minister in various cabinets, in 1934 he became chancellor after the assassination of Dollfuss. With the help of the Catholics he adopted a corporate system of gov. and tried to restore the monarchy under the Hapsburgs. Confronted with Hitler's demand for the annexation of Austria he made a show of resistance, but was summoned to Hitler's residence, and compelled, under threats, to sign an agreement to clear the way for Nazism in Austria.

On his return to Austria S. tried to organise a plebiscite against Hitler, but he was forestalled by the sudden irruption of Ger. troops on March 12, 1938. Austria was annexed and S. was held as a prisoner throughout the war. He became prof. at St. Louis Univ. in 1948. He has written *Farewell, Austria* (Eng. trans., 1938), and *Austrian Requiem* (1947). See study by R. K. Sheridan, 1942.

Schuster, Sir Arthur (1851-1934), physicist; b. at Frankfort-on-Main; son of Francis Joseph S. of that place and of London, merchant-banker. He was educated at Frankfort-on-Main, Geneva, Owens College, Manchester, univ. of Heidelberg, becoming Ph.D., Heidelberg, and D.Sc., Manchester. Chief of the eclipse expedition to Siam, 1875, and a specialist in spectroscopy, he became prof. of physics at the univ. of Manchester, 1888-1907. Secretary of the Royal Society, 1912-19, and foreign secretary of same, 1920-24, he was secretary, International Research Council, 1919-28. He won the Royal medal, 1893; the Rumford medal, 1926; and the Copley medal, 1931. Pubs. include *Introduction to the Theory of Optics* (1904; enlarged ed., 1924); *The Progress of Physics* (1911); and, with the late Sir A. K. Shipley, *Britain's Heritage of Science* (1917). He was knighted in 1920.

Schuylkill River, U.S.A., rises in Pennsylvania, flows S.E. through the Blue Mts., and past Pottsville, Reading, Norristown, and Philadelphia, where it joins the Delaware. Length 120 m.

Schwabe, Samuel Heinrich (1789-1875), Ger. amateur astronomer, b. at Dessau, was by profession an apothecary. In 1826 he began observations of the sun with a small and inexpensive telescope; in 1843 he announced his discovery that sunspot activity fluctuates between a definite maximum and minimum in a certain period, which he believed at first to be ten years, amending this in 1852 to eleven years. He received the gold medal of the Royal Astronomical Society in 1857.

Schwanthaler, Ludwig Michael (1802-1880), Ger. sculptor, b. in Munich of a family of sculptors. He gained the friendship of the painter Cornelius, who introduced him to King Ludwig, and he was employed in the numerous buildings erected by that ruler, including the Glyptothek, Pinakothek, and Ruhmeshalle.

Schwarz (or **Schwartz**), Berthold, see under GUNPOWDER.

Schwarzenberg, tn. of Saxony, Germany, 18 m. S.E. of Zwickau, with iron mines in the vicinity, metal works, an old castle, and a seventeenth-century church. Pop. 12,100.

Schwarzerd, Philip, see MELANCHTHON, PHILIP.

Schwarzwald, see BLACK FOREST.

Schwechat, tn. of Lower Austria, 7 m. S.E. of Vienna, with a large brewery and factories. Pop. 10,000.

Schweidnitz, see SWINICA.

Schweinfurt, tn. of Bavaria, Germany, on R. Main, 22 m. N.E. of Würzburg, with numerous manufs, especially of shoes. It contains the gymnasium founded by Gustavus Adolphus in 1631. Pop. 21,000..

Schweinfurth, Georg August (1836-1925); Ger. explorer, botanist, and archaeologist, b. at Riga, son of a Ger. merchant. He attended the high school of Riga, and took up natural hist., especially botany, to which he devoted himself at the univ. of Heidelberg, Munich, and Berlin. He travelled, 1857-62, in Russia, France, and Italy, and was afterwards employed arranging the botanical collections brought from the Sudan by von Barnim and Hartmann, which inspired him with an interest in Africa. S. examined the African coast of the Red Sea and travelled from Suakin through Abyssinia to Khartoum, 1863-66. Commissioned by the Prussian Academy to explore the Bahr-el-Ghazal area, he was there 1868-71, and discovered the R. Uele and the pygmies of Akka, much of his collected material being destroyed by an accidental fire in his camp. He described his experiences in *Im Herzen von Afrika* (1868-71, trans., *The Heart of Africa*, 1871, new ed. corrected according to latest discoveries, 1918). In 1873 he accompanied Rohlfs to the Libyan Desert, and lived from 1875 to 1889 mainly in Cairo. His collections, notably that of African plants, were in the Berlin Museum.

Schweitzer, Albert (b. 1875), Fr. scholar and medical missionary, b. at Gunsbach, Alsace, son of a Lutheran pastor. He was educated at Strasburg Univ. and at the univ. of Paris and Berlin, taking doctorates in philosophy, theology, music, and later, in medicine and surgery in order to qualify as a medical missionary. He is also a fine concert organist. S.'s earlier academic works include a treatise on the religious philosophy of Kant, which clarified certain obscurities in *The Critique of Pure Reason* (1899); *Quest of the Historical Jesus* (trans 1922), which flattered the theological doves in England; *The Mysticism of Paul the Apostle* (1931), a powerful and original interpretation of the apostle's religious thought; and a 2-vol. treatise on *John Sebastian Bach* (1908, 1934), in which he presents the composer as the supreme 'pictorial artist' in music. At this time he was prin. of the theological faculty at Strasburg, but, in pursuance of a long-cherished resolve, determined to abandon further prospects of a brilliant career and to qualify as a medical missionary to the natives of Equatorial W. Africa. By dint of intense concentration he took the degree of medicine and surgery and offered his services as a volunteer medical missionary in the Gabon prov. of Fr. Equatorial Africa. He went out to Lambaréné, in 1913, where he designed and founded a hospital, defraying the cost and expenses by lecture tours and from the profits of his books. His books on his African experiences include *On the Edge of the Primeval Forest* (trans 1922), particularly of the fight against leprosy and sleeping sickness; *More from the Primeval Forest* (1931); and *From my African Note-Book* (1939), sketches of tribal custom, fetish, and tabu. After the First World War he returned to Europe and wrote various works indicative of his scepticism over the progress of civilisation and his feeling

that the sacredness and freedom of human personality was being violated. These include *Philosophy of Civilisation* (1923-1925), a survey of the hist. of European ethical thought. He returned to Lambaréné again in 1924, and after coming home on furlough in 1927, he was there 1929-32, 1933-35, 1936-39, and 1939-1949. His *Indian Thought and its Development* (1936) is a notable addition to the comparative study of religious philosophy in Asia. His other works include *Paul and his Interpreters* (1912); *The Mystery of the Kingdom of God* (1925); and *My Life and Thought* (1933). See G. Seaver, *Albert Schweitzer, Christian*



Press Portrait Bureau

ALBERT SCHWEITZER

Revolutionary, 1911, and *Albert Schweitzer: the Man and his Mind*, 1917; O. Kraus, *Albert Schweitzer: his Work and his Philosophy*, 1944; Mrs. C. E. B. Russell, *The Path to Reconstruction: a Brief Introduction to Schweitzer's Philosophy of Civilization*, 1944; and J. M. Murry, *The Challenge of Schweitzer*, 1948.

Schweitzer, Claude Adrian, see HELVETIUS.

Schwelm, Industrial tn. of N. Rhine-Westphalia, Germany, 3 m. N.E. of Barmen, with manufs. of iron and steel goods, rope, textile goods, and a bookbinding industry. Pop. 23,000.

Schwenkfeld, Caspar von (1489-1561), Ger. mystic of noble family, b. at Ossing in Silesia. He was a fervent disciple of Luther in his youth, but eventually quarrelled with him. He then joined with the Anabaptists, but a little later formed a sect of his own which taught that God communicated Himself directly to every individual. He acquired many followers in Silesia and Swabia, and a colony was founded in America in the eighteenth century.

Schwenningen, tn. of Germany, in Württemberg, Germany, 39 m. S.S.W. of Tübingen. It manufs. clocks. Pop. 20,600.

Schwerin: 1. Cap. of Mecklenburg, Germany, on lakes S., Ziegell, and Ostorf, 35 m. S.E. of Lübeck. It contains a Rom. Catholic cathedral, and the grand-ducal palace, museum, and library, and manufs. musical instruments, lacquered ware and machinery. Pop. 55,600. 2. Tn. of Poland, on R. Warthe, 60 m. N.W. of Poznan. Pop. 9000.

Schwerte, tn. in N. Rhine-Westphalia, Germany, on the Ruhr, noted for nickel works and manufs. of iron and steel goods. Pop. 13,500.

Schwetzingen, or **Swiebodzin**, tn. of Württemberg-Baden, Germany, 6 m. W.S.W. of Heidelberg. Pop. 10,000.

Schwiebus, tn. of Germany, 42 m. S.E. of Frankfort-on-Oder. It has old walls, an anct. castle, and market place. There are iron mines. Pop. 9800.

Schwientochlowitz, see **SWIETOCHLOWICA**.

Schwind, Moritz von (1804-71), Austrian painter, b. at Vienna, educated there and at Munich, where he met Schnorr and Cornelius. His work, which sums up the romantic revival in art, is very varied, and includes wall-paintings, book illustrations, frescoes, easel pictures, and church windows. He was especially happy in legendary 'cycles.'

Schwyz, or **Schwytz**: 1. One of the four forest cantons of Switzerland, to which it gave its name, bordering upon the lakes of Lucerne, Zurich, and Zug. Area 351 sq. m. The surface is mountainous, the chief rvs. are the Sihl and the Muotta. Its industries include vine- and fruit-growing, cattle-rearing, and textile manufs. It sends three members to the National Council, and entered the Confederation in 1291. Pop. 66,600. 2. Cap. of the above canton, in the Muotta valley, at the foot of the Mython, 17 m. E. of Lucerne. Pop. 8500.

Sciacea, seaport tn. of Sicily, in the prov. of Agrigento, on the S. coast, 40 m. S.E. of Marsala. It is the headquarters of the Mediterranean coral fishery. Pop. 27,300.

Scioloja, Vittorio (1856-1935), It. jurist and statesman, b. at Turin, son of Antonio S. (1817-77), economist. He studied at univ. of Rome, and became prof. of Rom. law at the univ. of Camerino (1879), Siena (1881), and Rome (1884). He was nominated senator, 1904, and became minister of justice in the second ministry of Sonnino, 1909-10, minister without portfolio in the Boselli and Orlando Cabinets during the First World War, and of foreign affairs under Nitti, 1919-20. It. representative at the peace conference, as minister of foreign affairs he assisted in framing the Covenant of the League of Nations. S. was minister of State, 1927, and is the author of many works on law, especially Rom. law.

Sciatica, neuralgia of the sciatic nerve, the nerve which supplies the skin of the leg and the muscles of the thigh, leg, and foot. The disease is generally caused by exposure to cold or wet, or it may be associated with gout, rheumatism, or constipation. The pain is more constant

than in other forms of neuralgia, but may vary in intensity. It may be felt right along the course of the nerve, or be localised at the back of the thigh, the knee, ankle, etc. Hot fomentations, blistering, etc., may be tried to ease the pain; stretching of the nerve is sometimes employed with success. The felt treatment consists in injecting 'gr. of atropin, followed by 'i. gr. in 48 hrs., and 'ii. gr. in another 48 hrs. See further under **NEURALGIA**.

Science may be said to consist in the 'classification of facts, and the recognition of their sequence and relative significance.' This at any rate is the function of S., and it can at once be seen that the term has a far wider meaning than that popularly given it. It includes all forms of systematised thought; therefore it is not facts, nor even useful knowledge which forms S., but the *method* in which any facts are dealt with, and the material of S. is 'co-extensive with the whole physical universe, not only that universe as it now exists, but with its past history, and the past history of all life therein' (Karl Pearson). The goal of S. may, by lying in this line of thought, be said to lie in the examination, classification, and correlation of every phenomenon, past or present, in the universe; in other words, the goal is the complete interpretation of the universe. So the scope of S. is the ascertaining of truth in every branch of knowledge, and its method includes accurate classification of facts and observation of their correlation and sequence, the discovery of laws, and self-criticism. The facts of S. are inferences drawn and conceptions formed from sense-impressions by mechanical and mental association; therefore, its field is the contents of the mind. Further, scientific law is a résumé of as wide a range as is possible of the sequence of sense-impressions. It is, therefore, never arbitrary, and may constantly need modification. A further consideration of this will show that such a law involves no idea of necessity, pointing out, as it does, only how changes are taking place. That any given sequence has occurred continually in the past only allows of a conception of *probability*. Various attempts have been made to classify the different Ss.: Francis Bacon, postulating that all human learning takes its origin in memory, imagination, and reason, evolved a scheme (see Karl Pearson's *Grammar of Science*), whereby the sev. divs. of knowledge could be represented by the branches of a tree. Comte recognised six fundamental Ss.: mathematics, astronomy, physics, chem., biology, sociology, and the S. of morals (see **POSITIVISM**). He asserted that the study of any S. is limited by the requirements of the one next above it. The error of this is easily seen to-day by endeavouring to understand how astronomy can be regarded as the relating link between mathematics and physics. Spencer returned to Bacon's idea of the tree and regarded phenomena as the root branching immediately into concrete and abstract Ss. The latter included logic and mathematics; the former group subdivided into

abstract-concrete and concrete Ss., the first of these, including astronomy, biology, and sociology. To relate astronomy with these Ss., rather than with physics, is hardly natural; but Spencer's classification is important, because he utilised Bacon's tree system while agreeing with Comte in excluding theology and metaphysics from the field of knowledge.

Some of the chief landmarks in the hist. of S. are the development of astronomy, mathematics, and medicine, among the Gks., Indians, and Egyptians; the growth of systematic chem. and of optics among the medieval Arabs; the scientific renaissance of the twelfth century, as exemplified by Roger Bacon; the application of chem. to medicine by Paracelsus (1493-1541); the rise of mechanics and astronomy at the hands of Galileo (1600) and Newton (1700); the work of Harvey on the circulation of the blood (1640); and of Gilbert on the magnet (1600); the atomic theory of Dalton (1800); and the discovery of oxygen and the composition of the air (Priestley 1774; Lavoisier 1775); the overthrow of the caloric theory of heat (Rumford 1800); the discovery of voltaic electricity (Volta 1800); the work of Faraday on electricity (1831); Darwin's work on evolution (1859); and the discovery of X-rays and radium (1894-1900).

There have been remarkable interrelations between various branches of S. in recent years, of which a few examples may be noticed. It was not anticipated that radio would be applied for important meteorological purposes, such as confirming the existence of the Kennelly-Heaviside layer, and revealing sev. others, some closer to the earth and others at much greater distances than this layer. The same comment applies to radar which can be used to measure the diameters of raindrops and the distances of clouds. Developments in high-speed centrifuges have made possible the sedimentation of viruses on account of their high molecular weights, and they can now be obtained in comparatively large amounts. The chemist has come to the assistance of agriculture and the veterinary front in numerous ways, one example of which is 'bush sickness,' a disease once prevalent amongst the sheep in Australia, and to a smaller extent in Scotland. It was finally discovered that the disease was due to the absence of cobalt from the soil where the sheep grazed, and very minute quantities of this mineral were sufficient to eliminate the disease. Even when the soil is not deficient in minerals some impairment of the chemical processes of the body, to which the name metabolism is applied, is often in evidence, and here again the chemist renders important service. Even in genetics the assistance of the mathematician is required, and progress in astronomy would be impossible without the work of the physicist. In medicine and surgery X-rays and radio-therapy are well-known instances of the application of physics, and in recent times the use of tracers has played an active part in medical research. Many artificial radioactive elements are easily produced, and

it is easy to trace radioactive isotopes because of the radiation that they emit. The body, however, does not distinguish between isotopes of the same element, selecting atoms according to their chemical properties only. Hence by putting into food some radioactive atoms, which can be 'traced' because they are known or 'labelled,' it is easy to find out where and how soon the body takes up this food.

See H. Spencer, *The Classification of the Sciences*, 1864; J. S. Mill, *System of Logic*, 1866; K. Pearson, *A Grammar of Science*, 1892 (Everyman's Library 1937); A. N. Whitehead, *Science and the Modern World*, 1927; Sir J. Jeans, *The Universe Around Us*, 1929, and *The Growth of Physical Science*, 1947; E. W. Barnes, *Scientific Theory and Religion*, 1933; J. Needham and W. Pagel (ed.), *Background to Modern Science*, 1938; J. D. Bernal, *The Social Functions of Science*, 1939; F. Sherwood Taylor, *A Century of Science*, 1941; H. Butterfield, *The Origins of Modern Science (1300-1900)*, 1949; and I. B. Cohen, *Science: Servant of Man*, 1949.

Science and Technology, Imperial College of, see IMPERIAL COLLEGE.

Scientific and Industrial Research, Department of, was appointed by Order in Council dated July 28, 1915, to direct the application of money provided by charter dated Nov. 23, 1916 (amended by supplemental charter of April 27, 1928), to the purposes of scientific and industrial research. The members of this committee of the Privy Council were created a body corporate under the name of 'The Imperial Trust for the Encouragement of Scientific and Industrial Research,' and on Dec. 15, 1916, a separate dept., having its own parl. vote, was created for the service of the committee. Set up by the Asquith gov. under the stress of one world war, the dept. justified itself in a second war by contributions of the utmost value towards victory, and among its achievements was the organisation of the work of the Brit. scientific teams on nuclear fission, which resulted in the achievement, by the Americans, of the atomic bomb. A second outstanding achievement of the dept. was the invention of radar (*q.v.*), which resulted from the pre-war experiments of Sir Edward Appleton, Sir Robert Watson Watt (*q.v.*), and others under the auspices of the dept. The dept. was always designed to serve the permanent needs of a nation at peace, and when the war ended, the financial statistics show that it was preparing for its peacetime labours: down to 1914 expenditure never varied markedly from the £682,180 of the last financial year of peace; from 1945 onwards it increased rapidly from year to year and reached £2,694,061 in the year ended March 31, 1948. The aggregate net estimate for the dept. in 1949-50 amounted to £4,414,717, an increase of £1,091,554 on the same estimate for 1948-1949. The gross estimate amounted to £4,827,220: grants for research, £1,962,000; research work and research establs., £2,419,704; geological survey, £243,492; and headquarters administration, £202,024. The dept. serves the double

purpose of helping or persuading industry to take advantage of the progress of scientific discovery and of influencing scientists to attempt the sort of discoveries of which industry stands in need. To help individual industries in applying scientific method to the problems of their own technique there are co-operative research associations, receiving grants of public money through the dept. For the wide range of scientific studies which are for the material benefit of the community at large without being the concern of specific industries, the dept. itself organises and finances research in its own laboratories and those of academic societies. Such great and older institutions as the Geological Survey and the National Physical Laboratory were long ago brought within the dept.'s orbit. Other large subjects of investigation by the dept. include the work of the Fuel Research Station, the Radio Research Organisation, the Building Research Station, the Forest Products and Pest Infestation Research Laboratories, the Fire Research Organisation, and the Water Pollution Research Laboratory, all of them sections of knowledge in which every advance brings benefits to public health or welfare.

Scientific Method. Science is primarily concerned with the collection, arrangement, and classification of the knowledge about the world around us. It is subdivided for convenience into subjects like astronomy, physics, chem., biology, geology, etc., although there is no hard and fast line between any two so-called branches of science. Thus in astronomy one cannot investigate completely the ways of the stars without trespassing into the realm of physics; nor is it possible to have a complete understanding of the animal kingdom without encroaching considerably on the domain of chem. Collections of facts in themselves have little value, and the scientist merely starts from this point. The first essential is that all known facts about a particular subject to be investigated should be collected and verified thoroughly; all superfluous material must be rejected, and anything which contains an element of doubt must be recognised for what it is worth. Having collected and arranged the undoubted facts, the scientist then proceeds to make an hypothesis that will account for them. It is nothing more than a tentative suggestion in the first place, based, however, on known events. This is the essence of the method of induction, and is a valuable aid to science. But, having formulated an hypothesis to account for known facts, the next stage is to work upon this, and imagine other things which ought to follow, granted the hypothesis expresses a truth. These other things are next tested vigorously by experiment, and if the predicted conclusion is verified we have strong evidence in favour of the original hypothesis being sound. In fact we have deduced certain things which should follow, and have verified them by further experiment. It will be apparent therefore that science must constantly be

on the *qui vive*, accumulating facts by experiment, having insight enough to come to the conclusion and formulate an hypothesis, and stimulating further research to examine by experiment the logical outcome of the original hypothesis. Should the further experiment not bear out what was to be expected then the hypothesis becomes a matter of extreme doubt, and a new line must be taken. The process of deduction depends on a logical argument which can only be sound if the original assumption is correct and if the reasoning is correct. In logic the method is employed in the syllogism: e.g.

Major premise: All acids contain hydrogen.

Minor premise: Vitriol is an acid.

Conclusion: Vitriol contains hydrogen.

This conclusion therefore depends on the truth of the two statements, and, if these are true, the conclusion can be relied on. But if we have reason to doubt, say, the major premise, then the whole argument falls to the ground. Again, even if the premises are correct, the logic must be sound. Thus:

Major premise: All apples are attracted by the earth.

Minor premise: The moon is attracted by the earth.

Conclusion: The moon is an apple, which is obviously absurd, as the reasoning is faulty; the fallacy is known as 'the undistributed middle.'

The two important features in science are therefore induction, or arguing from the particular to the general, and deduction, or arguing from the general to the particular, and together they represent the basic principles adopted in S. M. Such searching methods must obviously test hypotheses fully, and it not infrequently happens that an hypothesis falls to the ground as a result of further experiment. Thus in the days before Lavoisier there was a very widely held hypothesis that combustion was due to the agency of an hypothetical substance 'phlogiston.' Those substances which contained a large proportion of phlogiston parted with it when burned. Lead, for example, would lose its phlogiston on being heated, and form a calx. The fact that this calx, when heated with a body (like carbon) rich in phlogiston, reverted again to metallic lead, would seem to uphold the idea. But in order to explain why lead *gains* in weight on being burned the phlogistians had to resort to the pretty thought that phlogiston was repelled by the earth, and therefore had negative weight. It was not until Lavoisier performed his celebrated experiments, calling in quantitative methods, and examining all possible causes, that the hypothesis was finally exploded, and a new one substituted. If an hypothesis, after repeated and vigorous testing, can still hold its own, it is in time designated as a theory, and if more and more tests are made, and the theory still holds, it arrives at the stage of a law, which is a short statement of facts, almost beyond the possibility of doubt. But it must be remembered that this possibility is still there, and even a law

may be abandoned or modified though the former is unlikely in most cases.' One instance of this possibility is found in Newton's laws which imply a mechanical world, in which particles move as the forces from other particles cause them to move, and in which the past completely determines the future. The astronomical universe and others as well seemed to stand secure on a mechanical foundation, but the Einsteinian universe has now replaced the old Newtonian conception.

As a result of new developments science is in a continual state of flux, and nothing can be regarded as absolutely final. Modern science is therefore based on a sound foundation of intensive and repeated testings. The good research worker in beginning a problem needs to take into consideration all the factors which are likely to affect his problem, and by a process of elimination arrive at some conclusion as to what is the real factor (or factors) acting as the cause of the observed phenomena. His efforts at hypothesis making are directed towards a desire to penetrate beyond the mere observed facts and stimulate further work. His guesses at truth may be fallacious, and may have to be discarded and new ones invented to account for the observed facts. The scientist has much in common with the philosopher, but he can go much further. Aristotle was content to collect facts, arrange them, and then invent many and varied explanations. Bacon (1561-1626) introduced the germ of the modern methods of induction and insisted on care and accuracy in sifting all available facts. In science the questions are never completely answered. Nothing is ever finished. Logic is an aid to help the scientist to test his statements, and in all his work, the hypothesis of uniformity in nature is relied on (i.e. what has happened will happen again under exactly the same conditions). See F. W. Westaway, *Scientific Method*, 1919.

Scilla, genus of bulbous plants (family Liliaceae) bearing racemes or corymbs of blue, pink, or white flowers. *S. nutans*, the wild hyacinth or bluebell; *S. verna*, the vernal squill; and *S. autumnalis*, the autumnal squill, are Brit. sev. species, especially *S. bifolia* and *S. hispanica*, are much valued in the garden. The squill of pharmacy is the dried scaly bulb of *S. maritima*, an Indian species.

Scilly Isles, 25 m. S.W. of Land's End. There are about 140 is. in all; many, however, are not more than clusters of rocks and only five (St. Mary's, Treco, St. Martin's, St. Agnes, and Bryher) are inhabited. The largest of these is St. Mary's, with a pop. of about 1500. The is. are the property of the Crown, and are administered by the duchy of Cornwall, but the is. of Treco, the most beautiful, is leased to Maj. A. A. S. Dorrien-Smith. The collection of tropical and sub-tropical plants and shrubs growing in the gardens have been collected by the Dorrien-Smith family over a number of years, and have been grown with great success owing to the warm and equable climate of the is., where frost and snow

are a rare occurrence. The climate is a great factor in the is.'s main industry, the growing of spring flowers for market. Agriculture plays an important part in the is. The farms are small, but well equipped with modern machinery. The average holding is approximately 20 ac. and is more in the nature of a market garden, with the land divided into small squares surrounded by tall hedges of *Ptiliosporum*, a New Zealand plant with a thick evergreen foliage. These hedges protect the crops from the Atlantic gales. There has been much drowning of the land by the encroaching sea, and by slow subsidence. In the past, fishing was one of the major industries, but there is little serious fishing done now. The is. are a popular holiday resort. Many people visit them during the summer months. There are recreations such as golf, tennis, and boating. The most popular sport among the local people is sailing, and races take place twice a week during the season. There is an air service between St. Just airport on the mainland and St. Mary's, and a boat service between St. Mary's and Penzance.

The is. are crowded with prehistoric burial-chambers, menhirs, middens, and hut vils. The stone-chambered barrows evidently represent a prov. extension of the great megalith culture of Brittany, as might indeed be inferred from the geographical setting of the is. It is thought possible that they may have been the special home of the dead, known in Celtic belief. Camden identified the S. I. with the fabled tin is. called the Cassiterides, to which came the Phœnician traders, but there is no evidence of the exact site of these Atlantic tin is. Tin was, of course, worked in Cornwall in the Early Iron Age and in Rom. times, but there is no trace of workings in the S. I. Some, at least, of the hut vils. belong to the Bronze Age, and to this time also may be attributed the auct. dividing walls of an early field system, examples of which are occasionally to be seen below present sea level. Total area 3500 ac. Pop. 1600.

See W. Borlase, *Scilly Isles*, 1756; E. G. Harper, *Scilly Isles*, 1910; J. Motherwell, *Isles of Scilly*, 1911; A. and H. Gibson, *The Isles of Scilly*, 1932; H. O'N. Hencken, *Archæology of Cornwall and Scilly*, 1932; and E. L. Bowley, *The Fortunate Islands*, 1915.

Scimitar (Persian *Shimshir*), short oriental curved sword, once used in the E., especially by the Turks and Persians. The blade broadens from the handle, and has one cutting edge, which comes to a point, the back being shorter and thicker.

Scinde, see CHIOS.

Scio, see CHIOS.

Scioto, riv. of Ohio, U.S.A., a r.-b. trib. of the Ohio. Length 237 m.

Scipio, famous patrician family of anct. Rome, belonging to the Cornelia gens. Among its chief members were:

Publius Cornelius Scipio, who was consul in 218 B.C. at the time of the second Punic war. He sailed to Gaul to prevent Hannibal crossing the Alps, but returned to Italy when he found he had been

anticipated by the enemy, and met Hannibal in Cisalpine Gaul, and suffered a defeat at his hands, narrowly escaping death. Being forced to retreat he took up his quarters at Placentia, subsequently moving to the l.b. of the Trebia, where, joined by the other consul, Sempronius Longus, he was again defeated. After this he crossed to Spain (217) to join his brother Gnaeus, and together they gained sev. victories; but in 212, having crossed the Iberus with the purpose of driving the Carthaginians out of Spain, they were both defeated and slain.

Publius Cornelius Scipio Africanus Major was b. in 234 B.C. He is first mentioned in 218 at the battle of the Ticinus. He fought at Cannae in 216, and was elected *edile* in 212, although he had not reached the legal age. His success in Spain was striking and rapid. In the first campaign (210) he took Carthago Nova, and in the course of the next three years he drove the Carthaginians entirely out of Spain. He returned to Rome in 206, and was elected consul for the following year (205), although he had not yet filled the office of *praetor*, and was only thirty years of age. After much opposition he obtained a fleet and army to invade Africa. The long struggle with the Carthaginians was at length brought to a close by the battle fought near the city of Zama on Oct. 19, 202, in which S. gained a decisive and brilliant victory over Hannibal. S. returned to Italy in 201, and entered Rome in triumph. He was censor in 199 with P. Aelius Paetus, and consul a second time in 194 with Ti. Sempronius Longus. In 190 S. served as legate under his brother Lucius in the war against Antiochus the Great. At his return he was himself accused of having received bribes from Antiochus. He retired to his country seat at Laturnum, and never returned to Rome. The year of his death is uncertain, but it is probably 183. See B. H. Liddell Hart, *Scipio Africanus: a Greater than Napoleon*, 1926, and R. M. Hayward, *Studies on Scipio Africanus Major*, 1933.

Publius Cornelius Scipio Aemilianus Africanus Minor was the younger son of L. Aemilius Paulus, the conqueror of Macedonia, and was adopted by P. Scipio, the son of the conqueror of Hannibal. He was b. about 185. S. first served in Spain with great distinction as military tribune under the consul L. Lucullus in 151. On the outbreak of the third Punic war in 149 he accompanied the Rom. army to Africa, again with the rank of military tribune, and gained still more renown. He returned to Rome in 145, and had already gained such popularity that when he became a candidate for the *edileship* for the following year (147) he was elected consul, although he was only thirty-seven. The long continuance of the war in Spain again called S. to the consulship. He was appointed consul in his absence, and had the prov. of Spain assigned to him in 134. His operations were attended with success; and in 133 he brought the war to a conclusion by the capture of the city of Numantia after a

long siege. He now received the surname of Numantinus in addition to that of Africanus. Upon his return to Rome in 132 he took the lead in opposing the popular party. He is supposed to have been murdered, and Cicero mentions Carbo as his assassin. See A. Schulten, *Numantia*, 1927, and K. Bilz, *Die Politik des Publius Cornelius Scipio Aemilianus*, 1935.

Seire Facias, in law, writ summoning a person to show cause why some order should not be made, as, for example, calling upon sureties to give reasons why a plaintiff should not have execution against them for a debt, or summoning a third person to show why goods in his hands by replevin should not be delivered in satisfaction of a judgment debt. S. F. was a common process to repeal a patent, but now a petition of the same tenor is used; and it was the customary process for making the individual members of a company liable upon a judgment entered against their public officer or other person sued as representing the company. There is no mention of S. F. in the *Judicature Acts (q.v.)*, but apparently a writ of summons can in appropriate cases be endorsed with a claim for a S. F.

Scirocco, see **SIROCCO**.

Sciron, in Gk. legend, robber who infested the neighbourhood of Megara, and threw his victims over the Scironian cliffs into the sea. Theseus inflicted the same fate on him.

Scirrhus, form of cancer which occurs mainly in the female breast, and is characterised by a hard growth. Treatment with Röntgen (X-) rays or with radium in early cases is of great benefit, although cutting out of the diseased part is the more common treatment.

Scissor-bill, see **SKIMMER**.

Scissors are made out of steel. Each blade is either forged by hand, or machine made, from one bar of steel, the 'bows' or finger holes being formed without welding. There are thirty processes in the manufacture of S., the most important being that of setting, as the blades must be so made that they cut from rivet to point. After setting the blades are filed and polished, and fastened together. Tailors' S. are made in two parts, the blades being made of crucible steel, and the bow and shank of iron, which is welded on. See also **CUTLERY**.

Sclerosis, term used in pathology for the hardening of a tissue, especially in the central nervous system. When occurring in the organs, the condition is called cirrhosis or fibrosis. Disseminated S. consists of diffuse areas of hardening in the spinal cord, with symptoms of paralysis, defects of speech and vision, etc. Arterio-S. is a thickening and hardening of the arterial walls.

Sclerotic, Solera, or Sclerotic Coat, the dense outer membrane of the eyeball. It serves as a protective coat, and is composed of fibrous tissue. It forms the 'white of the eye,' and is pierced by the optic nerve at the rear; it is continuous with the cornea in front.

Sclopo, see **under FIREARMS**.

Scodra, see **SKUTARI**.

Scolding-bridle, see BRANK.

Scolia (Gk. *σκολία*), short lyrical poems of anct. Greece, intended as drinking songs. Their invention was ascribed to Terpander, while Alcæus, Sappho, Simonides, and Pindar also composed them. The most famous scollion is that of Callistratus in praise of Harmodius and Aristogiton.

Scombridae, see MACKEREL.

Scone, New and Old, vills. of Perthshire, Scotland. New S. is situated on the Perth-Aberdeen road, 2 m. N.E. of Perth. Pop. 2500. Old S. lies 1½ m. to the W., on the Perth-Bracmar road. In its anct. palace (destroyed in the riots of 1559) the kings of Scotland were crowned. The coronation stone was removed to Westminster Abbey by Edward I. in 1296. Of the old tn. little now remains but the market cross. Pop. 3500.

Scopolomine (*Scopolamine*), see HYOSCINE.

Scorbutus, see SCURVY.

Score. Copy of any music written in sev. parts on separate staves, with the coincident notes appearing vertically over each other, so that the work can be read with comparative ease in a way that would be quite impossible with parts written out or printed separately for each participant. Complete orchestral or choral Ss. showing all the parts are given the name of full S.; arrangements of operas, oratorios, etc., for voices and pianoforte are vocal Ss.; arrangements for pianoforte only are piano Ss.; composers' sketches reduced to a few staves, to be elaborated and fully written out later, are known as short Ss. The usual lay-out of orchestral Ss. is in groups of various types of instruments, with the treble instruments of each group at the top and the bass instruments at the bottom, and the order is as a rule woodwind at the top, brass in the middle, and strings at the bottom. Harps, percussion, and any other extras are placed between brass and strings.

Scoresby, William (1789-1857), Eng. Arctic explorer and physicist, b. at Cropton in Yorkshire. In 1806 he was chief officer of the whaling ship *Resolution*, which reached lat. 81° 30' N.; in 1811 he took command of the *Resolution*. After many journeys to the Arctic regions he abandoned the sea in 1822, and was ordained in 1825. He became vicar of Bradford in 1839. He pub. *History and Description of the Arctic Regions* (1820); *Journal of a Voyage* (1823); *Memorials of the Sea* (1850); *Journal of a Voyage to Australia for Magnetic Research* (1859), etc. A ship of the whale-catcher type, named *William Scoresby* was built for the Discovery Committee and placed in commission in 1926. See further under DISCOVERY COMMITTEE.

Scorpio (the Scorpion), anct. zodiacal constellation, the eighth in order. The well-known 'triangle' is formed by Spica, Arcturus, and Alpha Scorpil. The most important star in this constellation is the 'red' star Antares. This star gives its name to the 'Antarian' type, i.e. those whose spectra contain a number of dark bands, sharp on the violet end and

fading off at the red end. Antares is at a very great distance (330 light-years) and its diameter is about 450 times that of the sun.

Scorpion, name for the order Scorpiones of the family of Arachnids (i.e. spiders and their allies), a few small species of which occur in S. Europe, but most abundant in tropical and sub-tropical regions, where some species attain a length of 9 or 10 in. They feed on the juices of other Arachnids and insects, seizing their prey with the powerful claws or palpi. They are nocturnal in habit, hiding during the day beneath stones and under the loose barks of trees. The females are viviparous, the eggs being hatched in the enlarged oviducts. Ss. are notoriously pugnacious, and their sting, though painful, does not prove fatal to adult human beings in good health. The stinging organ is situated on the telson, at the hind end of the abdomen. There are about 300 different species of S.

Scorzonera, genus of perennial plants (family Compositæ). The taproots of *S. hispanica* are used as a winter vegetable.

Scot, Michael, see SCOTT, MICHAEL.

Soot and Lot, par. dues by inhab. of certain corporate tns., the payment of which before the Reform Act of 1832 conferred the parl. franchise. The householders were not taxed to the same amount, but paid according to their ability.

Scotch Fir, see PINE.

Scotch Terrier, see SCOTTISH, OR ABERDEEN, TERRIER.

Scoter, generic name applied to species of *Oedemia* in the family Anatidae. *O. nigra*, the common S. or black duck, is found off the Scottish coasts, and its diet consists of molluscs. The female is entirely brown, while the male is black. *O. fusca*, the velvet S., is black with an orange bill and dark red feet, but the female is brown and has a brownish bill.

Scotists, see DUNS SCOTUS, and SCHOLASTICISM.

Scotland. The N. portion of the is. of Great Britain, bounded on the E. by the North Sea, on the N. and W. by the Atlantic, and on the S.W. and S. by the North Channel and Irish Sea, the Solway Firth, and England. The mainland is 285 m. in length, but varies very greatly in breadth, as much, in fact, as from 160 to 50 m. The E. coast is indented by deep firths, which in some cases extend many miles inland, the prin. of these being the firths of Forth, Tay, Moray, Cromarty, and Dornoch. The W. coast abounds in narrow promontories and inlets, and is fringed by a multitude of is. The entire coast-line is 2500 m. in length. The whole country is more or less mountainous and broken, and, indeed, it may be said that one is never out of sight of hills, mts., or rising ground of some description. But roughly speaking, the country may be divided into highlands and lowlands. The highlands may, generally speaking, be regarded as being all that part of Scotland which lies W. and N. of a line drawn along the firth of Clyde, and thence in a N.W. direction from the

Clyde estuary to Stonehaven on the E. coast. The only large lowland area in this region is in the N.E. cos., embracing the N. portions of Banff, Moray, and Nairn, and the E. part of Aberdeenshire. Still further N., Caithness is the wide plain which is continued geologically with the Orkney Isles. The W. coast is almost wholly highland, whilst the E. is level and a typical agric. country. The Highlands may be said to cluster round the Grampian Range, of which Ben Nevis (4406 ft.) is the highest peak. The southerly spurs of this range are bounded by the Sidlaw Hills, the Ochils, and the Campsie Fells. On the S. side of the firth of Forth, again, a miniature highland country is formed by the Moorfoots, Pontlands, and Lammermuir, the Eildons, Lowthers, and Cheviots. The Highlands proper are traversed by the Caledonian Canal, a semi-artificial waterway connecting Lochs Ness and Lochy. S. of the Grampians lies the great valley of Strathmore, stretching for 100 m. through the cos. of Perth, Angus, and Kincardine. The prin. rivs. are: on the E. coast, the Tweed, Forth, Tay, Dee, Don, Spey, Esk, and Nith; on the W., the Clyde. Of the great inland lakes, Lochs Katrine, Lomond, Morar, and Awe are the most important.

CLIMATE.—The climate is variable, but extremes of cold and heat are rarely experienced. In winter the mean temp. is about 35°, and in Aug. about 58°. The W. dists., moistened by the genial sea-breezes of the Gulf Stream, are warmer and also wetter than the E. The climate resembles that of England; but being further N. it is colder, and the hills are renowned for their mists. The Highlands, especially, are bleak. In autumn and early winter westerly winds prevail, but in spring easterly and N.-easterly winds are severely felt. Although summer is often quite as warm as in the S. of England, the winters are much more salubrious than in that region. In fact, the climate of Scotland is on the whole, though variable, much more bracing and less treacherous than that of the sister country. In the central dists. snow-storms, though frequent in winter, are no more rigorous than in the Lake Dist. of Cumberland, and on the E. coast the average of sunshine is very much higher than on the E. coast of England. The land for the most part being hilly is well drained, so that the dampness which so adversely affects many of the best cos. of England is altogether absent, except on the W. coast, which is notoriously rainy and relaxing. On the whole the climate of Scotland compares favourably with England, excepting, perhaps, Cornwall and Devon.

AREA AND POPULATION.—Scotland is 29,796 sq. m. in area, including 186 Scottish is. In addition there is inland water to the extent of 609 sq. m. By the census of April 1931 the total pop. of Scotland was 4,842,554, of whom 2,325,867 were males and 2,516,687 females. This total comprised visitors and residents, Brit. nationals and aliens, civilians and

non-civilians, and was a decrease of 39,943 since the census of 1921. On the basis of the 1931 census the urb. pop. was 69·4 per cent of the total. The figures of the national registration of Sept. 1939, which did not include members of the armed services, and in some cases include evacuees not normally resident in the areas, are given below in parentheses after the 1931 figures for cos. and burghs. (The pop. in 1940 was estimated to be 5,030,000.) The pops. of the thirty-three civil cos. of Scotland by the census of 1931 were: Aberdeenshire, 313,521 (324,951 in 1939); Angus, 270,190 (261,633); Argyllshire, 63,050 (70,962); Ayrshire, 285,217 (318,890); Banffshire, 54,907 (53,428); Berwickshire, 26,612 (27,515); Buteshire, 18,823 (24,028); Caithness, 25,636 (24,344); Clackmannanshire, 31,948 (34,885); Dumfriesshire, 81,070 (87,524); Dunbartonshire, 146,723 (156,463); East Lothian, 47,338 (52,556); Fife, 276,368 (284,098); Invernessshire, 82,108 (84,293); Kincardineshire, 26,780 (28,402); Kincross, 7454 (8199); Kirkcudbright, 30,518 (33,924); Lanarkshire, 1,587,663 (1,517,950); Midlothian, 526,296 (502,019); Moray, 40,806 (43,556); Nairn, 8294 (8575); Orkney, 22,077 (21,952); Peeblesshire, 15,051 (16,251); Perthshire, 120,793 (138,922); Renfrewshire, 287,991 (321,247); Ross and Cromarty, 62,799 (62,246); Roxburghshire, 45,685 (48,620); Selkirkshire, 22,711 (22,874); Shetland (Zeland), 21,121 (19,867); Stirlingshire, 166,447 (177,562); Sutherland, 16,101 (15,329); West Lothian, 81,431 (82,490); Wigtownshire, 29,331 (32,064).

The pop. of burghs exceeding 35,000 was, according to the 1931 census: Glasgow, 1,093,337 (1,010,043 in 1921); Edinburgh, the cap., 439,010 (408,512); Dundee, 176,424 (160,327); Aberdeen, 169,803 (173,333); Paisley, 86,445 (90,955); Greenock, 79,012 (78,863); Motherwell and Wishaw, 65,611 (63,391); Clydebank, 46,991 (44,108); Kirkcaldy, 44,559 (45,126); Coatbridge, 43,312 (43,786); Ayr, 38,905 (43,776); Kilmarnock, 38,681 (41,636); Hamilton, 38,112 (38,355); Falkirk, 36,566 (36,707); Dunfermline, 35,058 (34,900); Perth, 35,051 (38,379).

PRODUCTIONS.—Scarcely more than a fourth part of Scottish ground is under cultivation, though agriculture is one of the staple industries of its people. Of the various kinds of crops raised the corn crop is much the most important, and oats, barley, and wheat are grown. Oats take the first place, covering a very much larger area than either of the others. Barley, being constantly in demand for distilling purposes, comes next in order, while wheat is cultivated only to a comparatively small extent in Scotland. Other crops grown are beans and rye. Turnips and potatoes are the prin. green crops. Sugar-beet crops are increasing in importance, especially in Fife. The Cupar sugar beet factory is equipped to handle 12·0 ac. production annually. In the S.W. dairy-farming is an industry of considerable importance, and Ayrshire cattle, being good milkers, are the most popular breeds in these cos. Large herds

of cattle are also kept in the N.E., but these are of a kind more valued in the meat market. Varieties of sheep include the black-faced breed of the Highlands and the Cheviots, the former raised for mutton and the latter for their wool. In Shetland also there is a variety of sheep with soft, fine wool, known as 'Shetland wool.' From the same dist. come the hardy little Shetland ponies, while the Clydesdale draught-horses are famed everywhere. All over the sparsely populated Highlands, where much of the ground is unfit for cultivation, there are extensive deer 'forests' and grouse moors. Pheasants, partridges, black game, and hares are preserved. In recent years the study of arboriculture has received more attention, and the planting of forests—mainly composed of varieties of Scottish fir—to replace those cut down has progressed in a proportionate degree. The sea fisheries all round the coasts contribute materially to the wealth of Scotland. They are administered by the Scottish Home Dept. (Fisheries Div.), St. Andrew's House, Edinburgh, and for administrative purposes the coastline is divided into twenty-seven fishery dists., supervised by the dept.'s fishery officers. The prin. centres of white fishing are Aberdeen, Granton and Leith, Lossiemouth, Wick, Arbroath, Mallaig, Oban, and Ayr, while herring fishing on a considerable scale is conducted from Fraserburgh, Peterhead, Lerwick, Stornoway, Ullapool, Mallaig, Tarbert (Argyll), Ayr, and Campbeltown. The prin. kinds of white fish landed are cod, haddock, whiting, hake, lemon soles, plaice, hulloibut, and skate. The valuable herring fisheries account for about half of the landings of sea fish at Scottish ports. Salmon are fished in many of the rivers and lochs and also in the sea along the coasts. Considerable revenue is derived from the shell fisheries which produce lobsters, crabs, mussels, etc.*

The chief minerals are coal, iron ore, stone, and oil-shale. Coal is known to have been mined as early as the twelfth century. About half the total output of coal was obtained from Lanarkshire, but the coal seams there are running out. Many pits have been closed, and miners are encouraged to move to Fife and Midlothian. New tns. are being built for the miners in Fife. There are also coal-mines in Ayr, Stirling, and more than a dozen different cos. Iron ore is mostly found in Ayrshire, and pig-iron is smelted in Lanarkshire. Granite, though quarried all over Scotland, is principally obtained in Aberdeen, and from some of the E. cos. paving stones are exported. There are slate quarries in Argyllshire.

MANUFACTURES.—The earliest industries which are known to have been carried on in Scotland were those of linen and wool, both of which flourished in the sixteenth century. Linen has retained its place as an important manuf. to this day. It is now mainly carried on in Angus, Perth, Clackmannan, and Kinross. The chief centres are Dundee (Angus) and Dunfermline (Fife), which have monopolised the industry so far as the United Kingdom

is concerned. Jute, once the staple industry of Dundee, is still important there, and has been, since 1860, a serious rival to flax. Hemp is also made use of for this purpose. In Glasgow and Paisley, where the linen industry at one time flourished, it has been displaced by the manuf. of cotton, which is also one of Scotland's foremost industries. It is chiefly centred in Glasgow, and in the country round about, within a radius of some 30 m. Tweeds are made chiefly in Galloway, Selkirk, Dumfries, Hawick, and Innerleithen, and a big export trade is carried on with the U.S.A. and France; plaids are made in Inverness, Elgin, and Aberdeen, and wool-spinning is carried on in Kinross and Alloa. Lace is made in Nowmillis and Darvel. Silk is also manufactured, though to a comparatively small extent, in Glasgow and Paisley. Linoleums and floor-cloths are made in Kirkcaldy, and carpets in Glasgow, Kilmarnock, Paisley, Greenock, and Ayr. Iron and steel-working and shipbuilding form a most important part of Scottish manuf., and Scotland has suffered in the past from over-dependence on these heavy industries. Glasgow is their chief centre, with Motherwell and Coatbridge for iron and steel, and the Clyde for shipbuilding. The Carron ironworks, in Stirlingshire, have been in existence since 1760, and are among the largest works of the kind in the United Kingdom. Locomotives and all kinds of machinery are manufactured, and extensive shipbuilding and engineering operations are carried out, notably on the Clyde. Glasgow, Clydebank, Greenock, Leith, Aberdeen, and Dundee are the prin. shipbuilding centres. Another industry, which has sprung up since 1850, is the obtaining of mineral oil from shale. The headquarters of this industry is Bathgate, but it is distributed over Midlothian and Linlithgow. In recent years it has been realised that light engineering and similar industries would help to rescue industrial Scotland from her dependence on the heavy industries. From 1932 to 1937 Scotland had only 127 of the 3217 new factories started in Britain. In the same period Scotland lost 133 factories. The Scottish Development Council (*g.p.*) was formed, and from it came Scottish Industrial Estates Ltd. Within ten years they were operating twenty-three industrial estates in various parts of Scotland and thirty-two individual sites with an occupied factory space of over 10,000,000 sq. ft. The factory space had increased ten times in ten years. The potential total development of industrial estates in 1950 represented 20,000,000 sq. ft. of factory space. Among the light industries which have been developed are clothing, chemicals, plastics, clocks, cash-registers, refrigerators, light alloys, food manufacture, typewriters, glass, pottery, and radio sets. The Scottish Seaweed Research Association are interesting the industrialists in the potentialities of the constituents of seaweed. The North of Scotland Hydro-Electric Board started in 1943 to develop highland water power for the whole of Scotland. The

board has £80,000,000 to spend for the rehabilitation of the Highlands and has already brought electricity to many out-of-the-way places, including some of the primitive 'black houses' on the Isle of Lewis. Scottish burns and lochs can produce one-seventh of Britain's electric power, if harnessed. Glasgow remains the great industrial centre of Scotland, although the move of the coal miners to the E. coast will undoubtedly affect Glasgow's position in years to come. Old Scottish industries still prospering are distilling and brewing and Scotch whisky retains its pre-eminent position throughout the world. Brewing is on a big scale in both Glasgow and Edinburgh. Edinburgh is the main centre of book publish-

ing in the history of travelling, and from a small beginning these made rapid progress till there are now well over 3000 m of railway in Scotland. The Scottish railways were linked with the systems organised as the London, Midland and Scottish and London and North Eastern, and are now part of Brit. Railways.

The Forth is spanned by the Forth Bridge, constructed 1882-89, length 5330 ft., and the Tay by the famous Tay Bridge, at Dundee, which is 2 m long. There is at present much agitation for a Forth road bridge to take the place of the present somewhat slow ferry system. There are in Scotland more than 150 m of canals. The Caledonian Canal crosses Scotland from Fort William to Inverness,



Alasdair Mac Gregor

THE HIGHLANDS THE BALLACHULISH FERRY LOCH LEVEN ARGYLLSHIRE

In the distance in the mountains of Morven.

ing, with the attendant industries of printing and paper making. Catering for tourists is also an important activity in Scotland.

COMMUNICATIONS. Before the invention of railways in the early part of last century, roads were in Scotland as elsewhere, the only means of overland communication. At first all travelling was done on foot or on horseback while goods were conveyed from place to place on pack-horses. In 1610 stage coaches were instituted and thereafter became the primary mode of travelling. The roads were maintained by the people themselves, each tenant being required to provide a certain amount of labour to keep them in repair. On the opening up of the Highlands, in the first quarter of the eighteenth century, roads were made in all directions under the superintendence of Gen. Wade, thus offering facilities for travel in a region that was then very little known. The introduction of the railways opened up a new

era in the history of travelling, and from a small beginning these made rapid progress till there are now well over 3000 m of railway in Scotland. The Scottish railways were linked with the systems organised as the London, Midland and Scottish and London and North Eastern, and are now part of Brit. Railways. The Forth is spanned by the Forth Bridge, constructed 1882-89, length 5330 ft., and the Tay by the famous Tay Bridge, at Dundee, which is 2 m long. There is at present much agitation for a Forth road bridge to take the place of the present somewhat slow ferry system. There are in Scotland more than 150 m of canals. The Caledonian Canal crosses Scotland from Fort William to Inverness, joining Loch Linnhe to the Moray Firth via Lochs Lochy, Oich, and Ness. It is 17 ft in depth, affording passage for ships of 300 tons. The Caledonian Canal crosses Kintyre from Loch Fyne to the Sound of Jura, and can accommodate vessels of 160 tons. The Forth and Clyde Canal as its name indicates connects the firths of Forth and Clyde passing through Glasgow and meeting the Forth at Grangemouth. Two smaller canals, the Union and the Monkland, are no longer used as industrial waterways. The Union runs from Edinburgh to join the Forth and Clyde Canal at Grangemouth. It provides water for industrial undertakings and is used for pleasure craft. The Monkland runs from Airdrie to join the Forth and Clyde Canal at Glasgow. It was once important because of coal-mines (now derelict) near Airdrie and Coatbridge. It provides water for industrial use, and is also used as a 'filler' for the Forth and Clyde Canal. The remote

parts of Scotland have been rendered easy of access by the introduction of air travel. Many highland people are now more accustomed to travelling by aeroplane than by train. From the Glasgow airport at Renfrew, there are air services to Aberdeen, Barra, Bonbecula, Campbeltown, Inverness, Islay, Orkney, Shetland, Stornoway, Tiree, and Wick. Renfrew has also services to the prin. cities of Europe. Prestwick, the great international air terminal of the Second World War, is the main airport for foreign travel.

HISTORY.—Scotland is first historically connected with Britain during the period of the governorship of Agricola (A.D. 78). The original inhab. of the country were the Picts; once considered of non-Aryan race, but now generally held to be of Celtic speech, though whether this was more akin to Gaelic or Welsh is uncertain. In A.D. 84 Agricola won a great battle against the Picts at a place known as Mons Grampius, but no permanent conquest was made, nor was any of Scotland really under the control of the Romans. Agricola constructed a line of forts which ran from the firth of Forth to the firth of Clyde, and this was probably at a later date strengthened by means of a mound or earthen wall, but the prov. of Valentia, which lay between the wall of Hadrian and the wall of Antoninus (constructed on the line of Agricola's forts), was only nominally under the control of Rome. For all practical purposes the N. boundary of Britain was Hadrian's Wall. During the later period of the Rom. occupation the Picts seem to have been often of considerable trouble to the Romans, and to have frequently attacked the wall itself, and with the withdrawal of the Romans, in 410 the whole of N. Britain fell into their hands. Amongst the other disturbers of the peace of Britain were the Scots or Dalriads from Ireland, an Irish race speaking Gaelic, who joined in the attacks on N. Britain. When the Eng. tribes began their invasions the Angles settled in the kingdom of Bernicia, which extended from the Tees to the Forth. This settlement was made by Ida, who estab. his chief fortress at Bamburgh; later this kingdom, together with the kingdom of Deira, which stretched from the Tees to the Humber, was united to make the kingdom of Northumbria. The Eng. portion of S. Scotland is usually spoken of as Lothian. At the beginning of the sixth century the Scots or Dalriads crossed over from Ireland and settled in that part of Scotland now known as Argyllshire. They were Christian, and followed the rule of the Celtic Church. Scotland can at this time be described as divided up in the following divs.: In the N. and E., the Picts; S. of the Forth, the Eng. in Lothian; in Argyllshire, the Scots; and in the S.W., the Brythonic Celts (Welsh) in Strathclyde. Of these the Welsh and the Scots were Christian, although the Christianity of the Welsh was rapidly being absorbed by paganism. In 563 St. Columba came from Ireland and settled in the island of Iona, and from here he set forth on a missionary journey to the king of the Picts, whom

he converted. The Eng., however, still remained heathen, but at the beginning of the seventh century Oswald came to Iona and there learnt Christianity. When he succeeded, he sent for missionaries, and soon the N. kingdom of the Angles was converted to Christianity by the Celtic Church. Paulinus, the Rom. missionary, also had tried to convert it. But the Rom. Church was ultimately to conquer, and after the Synod of Whitby (664) had declared itself in favour of the Rom. system of church government, the whole of Scotland also fell slowly into line. For a time the kingdom of Northumbria exercised an overlordship over all the kingdoms of the N., but the battle of Nechtansmere crushed the power of Northumbria, and the N. kingdoms were free to quarrel amongst themselves. The unity of their religion had prepared the way, as it had in England, for ultimate national unity; but for some considerable time constant struggles took place between the Pict and the Scot, ending at last in favour of the Pict, who was able to extend his rule over the Scot as well. But another national danger threatened; the invasions of the Vikings so weakened the Picts that they were conquered with ease by Kenneth MacAlpine, king of the Scots of Dalriada, and descended also on his mother's side from the Pictish royal house. He now became the ruler of the Picts and Scots, and the country began to be termed no longer Pictland but Scotland. Still he ruled only the Scots and the Picts, but he was able, owing to the weakness of Northumbria, to extend his rule over Lothian, and he formed an alliance with Strathclyde, and in that way prepared for the ultimate union of the whole of Scotland.

Immediately that Scotland begins to appear as a united nation begins also that very vexed question as to the exact position of the Scottish kings in relation to the kings of England. The Scottish kings admitted the vassalage for the Eng. possessions which they held, whilst the Eng. kings receiving that homage held that it was as suzerains of Scotland that they received it. The early hist. of a united Scotland is very obscure. The succession question seems to have been based upon a system of tanistry, although Malcolm I. attempted to base it upon primogeniture. During the quarrels which followed Malcolm's attempt, we have the appearance of Macbeth, sub-king of Moray, and *macmor* or earl. The story of Macbeth as given by Shakespeare is unhistorical. Macbeth certainly did rise against Duncan and slay him, but Duncan himself was regarded as a usurper by many of his own subjects. Macbeth was defeated by Siward, but not deposed; finally he was overthrown by Malcolm Canmore (Birchhead), the son of Duncan (1057). The reign of Malcolm Canmore is of great importance in Scottish hist. His marriage with Margaret, sister of Edgar Atheling, did much to spread still further Eng. ideas and ideals throughout Scotland and intensified the hatred of all things Norman. Homage was paid to William by Malcolm, but

what exactly this homage was for still remains a matter for dispute. Again he asserted his absolute independence of England in the reign of William Rufus, and finally died fighting against the Eng. at Alnwick (1093). The influence of his wife (St. Margaret) was also very great. The rough Celtic element was toned down, and during this reign the old Celtic Church ideas were finally discarded. The Scottish Church from its inception was a protesting Church, and many Presbyterians still claim the old Celtic Church as essentially Presbyterian. From this time onward, however, the Scottish Church is entirely Rom. in its organisation. The death of Malcolm was followed by long disputes concerning the succession. Edmund and Donald Bane contested the throne; Duncan, the son of Malcolm, was supported by England; and finally, on his death, Edgar, another son, succeeded. Before his death he divided Scotland between his two brothers, Alexander I. and David. Alexander's reign was marked by an attempt, cleverly evaded, to establish the supremacy of the archbishop of York over Glasgow and St. Andrews. David I., who succeeded Alexander as king of Scotland, is responsible for the feudalisation of the greater part of the country, and it is important to notice here that from the period of the influence of Margaret the Eng. element becomes more important in Scotland; but the stronger Celtic element was never entirely submerged, even at the court. David had been educated in England under the influence of Normans, and introduced Norman customs and manners, Norman systems of land tenure, and Norman municipalities. During his reign civil war broke out in England, and David espoused the cause of his niece Matilda, daughter of Henry I. of England. In spite of a settlement in 1135, which recognised his son as earl of Northumberland and Huntingdon (a title which David had obtained by marriage), David finally invaded England, but was deserted by his vassals and defeated at Northallerton (Battle of the Standard), 1138. He was, however, able to keep a precarious hold on the N. of England owing to the unsettled condition of England during Stephen's reign. The influence of David, however, in Scotland cannot be overrated. He supported the Church and founded many abbeys; he encouraged architecture, and helped agriculture. To many of the tns. he gave charters; he divided Scotland up into feudal fiefs held on the feudal system; and he was responsible for the introduction of the idea of the king's peace. Breaches of the law were no longer matters of offence against the tribal system, but against the peace of the king. There was as yet no taxation or Parliament, but we can trace during this period the forms from which both these developed. Opposition to the king was forced to take violent measures; it could take no constitutional step, since there was no constitution. David died in 1153, and was succeeded by his son, Malcolm the Maiden. During his short reign

the power of the Lord of the Isles was subdued, but Malcolm died in 1165 and was succeeded by William the Lion. William attempted to seize Northumberland in 1173, and allied himself with Henry, the young king, son of Henry II., and with France. He was defeated and captured at Alnwick, and signed later the treaty of Falaise, by which he became the vassal of Henry II., definitely this time for Scotland. For fifteen years Scotland was a vassal country of England, and then in 1189 Richard I. sold back the rights which his father had won, and the Scottish king again became only the vassal of the Eng. king for the Eng. lands which he possessed. During the rest of his reign peace was preserved with England, and William died in 1214.

He was succeeded by his son Alexander II., and the next two reigns, in the light of the events which were to follow that period, were regarded as the golden age of Scottish hist. Peace was maintained, and although there were intervals of party strife, still on the whole the country was prosperous. In 1249 Alexander III. succeeded at the age of eight. Until he reached man's estate, various factions of the nobility gained considerable power by possessing themselves of his person. In 1251 he married a daughter of Henry III., and in 1261 was born to him a daughter, Margaret. This princess later married Eric, king of Norway, and was the mother of the Maid of Norway. On the accession of Edward I. Alexander III. did homage 'for the land which he held of the English king.' The Scottish version declares that he definitely said 'saving my kingdom of Scotland,' but in any case the homage was as vague as Scottish homage usually had been. In 1285 he fell from his horse and broke his neck whilst riding in the dark of night along a cliff near Kinghorn. His son and daughter had both died before him; his only heir was the Maid of Norway, his grand-daughter, aged seven, and she had been recognised by the Estates as the successor to the throne. The death of Alexander III., however, was a great calamity for Scotland, and plunged the country into war, which lasted for the next thirty years.

Edward of England was immediately informed of the death, and the custody of the realm of Scotland passed into the hands of a committee of six. The nobility were divided into followers of Bruce and followers of Balliol, and for the next few years Scotland was threatened with civil war. Edward's great ambition, however, was to make a united Great Britain; he therefore determined to marry the Maid of Norway to his son Edward of Carnarvon. A papal dispensation was obtained; the consent of the Scottish Estates was given, and the Maid was brought over from Norway, but she died in the Orkney Isles (1290). By the marriage treaty which had already been drawn up, it had been agreed that the independence of Scotland should be recognised; but Edward had introduced his saving clause, which assured to him the rights which he had or wished to have. It was obvious, therefore, what

Edward intended to do. Scotland was on the verge of civil war, when Edward appeared on the border and was appointed arbitrator. He caused an inquiry to be made into the question at issue, and then at Northampton met the Scottish representatives. He demanded homage and acknowledgment as lord-paramount of Scotland. As he held the whip hand it was obvious that all the claimants must acknowledge him as such, and accordingly such acknowledgment was given. He himself reserved the right of putting in a claim of his own if he thought fit. The claimants numbered over a dozen, but the two most important were John Balliol and Robert Bruce. Balliol was the great-grandson of David, earl of Huntingdon, brother of William the Lion, and was descended from the eldest daughter of that prince. Robert Bruce was the grandson of the same prince, and descended from the second daughter. He claimed that he had been selected by Alexander II., that he was nearer the original stock than Balliol, and finally that by Scottish custom he was the nearest heir. In Nov. 1292 Edward gave his decision in favour of John Balliol, who was accordingly crowned at Scone; the coronation, however, was ill-omened. Edward had shown clearly throughout what his policy was to be, and now he began what can best be described as a series of petty persecutions. Balliol was to be puppet king and Edward was to rule the whole of Great Britain. Balliol would tolerate much, but even he was driven to revolt by the policy of Edward. Balliol was ordered to go to Gascony with Edward; he refused, renounced his allegiance, and began war. In 1296 Edward took Berwick, massacred the inhab., then marched N. and defeated the Scots at Dunbar. Hence he marched still further N. At Brechin Balliol surrendered himself and the crown, and Edward marched back again into England. He took with him Balliol as a prisoner, the Stone of Destiny from Scone, and many documents. He did not trouble to appoint another king: in future he was to be king of Scotland himself. Scotland was conquered as Wales had been, and Cressingham and Surrey were left to govern it; such at least was Edward's idea. But Scotland was not to be so easily conquered. In 1297 opposition to the Eng. began to show itself in all parts of Scotland, and this became effective under the leadership of William Wallace of Elderslie, Renfrewshire, a man of the lesser nobility. He is traditionally spoken of as an outlaw, and naturally many stories have gathered round his name. Bruce and the bishop of Glasgow were also in revolt, but gave in very soon. Wallace, on the other hand, attacked by Surrey and Cressingham at Stirling Bridge, caught the Eng. army as, for the third time, it was deploying across the bridge, cut it to pieces, and drove it from the field. Surrey escaped, but Cressingham was killed, and, as later stories say, flayed by an infuriated peasantry. Wallace now savagely ravaged Cumberland, and he was nominated guardian of the kingdom of Scotland in

the name of King John. By 1298 Edward was moving on Scotland, and came up with the forces of Wallace in July at Falkirk. Wallace's army had suffered much from desertion, and his position had been further betrayed to the Eng. king. At the beginning of the battle his cavalry fled, but his spearmen, forming into *schiltrons*, held the cavalry of Edward at bay, until, thinned by the persistent fire of the archers, they were broken and defeated. Wallace fled, but for some time the opposition against Edward seemed stronger than ever. The papacy intervened on behalf of Scotland, and the Eng. baronage, enraged by the action of the pope, gave more support to Edward than hitherto. By 1303, peace having been made with France, Scotland was easily overrun. By 1304 Wallace had returned to Scotland, and in that year he was handed over to the Eng. king by Monteith, sheriff of Dumbartonshire. He was hanged, drawn, and quartered, and finally disembowelled, after a trial discreditable to Edward I. He had never sworn allegiance to the Eng. king, had remained persistently loyal to Balliol, and had not given support to the Bruce party; his great work, which makes him so worthy a national hero of Scotland, was his commencement of the struggle for independence.

For a while it seemed as if at last Scotland were conquered. The commoners longed for peace. Edward was preparing to rule Scotland wisely and well, when suddenly all Scotland was inflamed again by the rising of Robert Bruce. Bruce had fought often for Edward I., equally often against him, but now, by his murder of the Red Comyn in the church at Dumfries, he had definitely crossed the Rubicon. He was excommunicated, and in the eyes of Edward a traitor. He could look for help to no one save his own kinsmen, but he was crowned in Scone, and for the rest of Edward's reign he fought a guerilla war against him, now hopelessly defeated and now springing out suddenly where he was least expected, and defeating the Eng. troops. His supporters were killed at sight, and he himself escaped narrowly on more than one occasion. He was probably saved from utter defeat by the death of Edward I. at Burgh-on-Sands in 1307. Although Edward left strict orders that the campaign in Scotland was to be immediately carried on, his son Edward II. disregarded them. He alienated the commoners of Scotland by his cruelties, he wasted his opportunities, and soon found that Bruce was the centre of a national opposition. The opportunity for crushing Scotland was gone. The next few years were occupied by Bruce, who was supported by his brother Edward Bruce, in seizing the strongholds of Scotland. One by one these fell into his hands, until he was almost the complete master of Scotland (1311). A feeble invasion by Edward II. had been easily repelled. Edinburgh and Stirling were still in Eng. hands, but in 1313 the former was seized and the latter invested. Edward Bruce granted a truce

to the besieged in Stirling, the conditions being that unless it was relieved within twelve months it was to surrender to the Scots. Edward II. made his last great effort. England was more or less united, the baronage supported Edward, levies were drawn from all parts of the kingdom, and a huge army was thus gathered together. In 1314 50,000 men marched into Scotland under Edward's banner to relieve Stirling, and hence to conquer Scotland. In June of that year the Eng. army was routed by the Scots at Bannockburn (*q.v.*), and the independence of Scotland practically assured. Bruce was now master of the whole of the country. Ireland was invaded, but the attempted conquest under Edward Bruce failed (*see IRELAND, History*), and finally the excommunication was removed from Robert Bruce and he was acknowledged as king of Scotland by the pope. Bruce married his daughter Marjory to the steward of Scotland, and from this marriage sprang the Stuart dynasty. In 1328, after the murder of Edward II., the independence of Scotland was recognised by the treaty of Northampton, and in the following year, after seeing his ambition realised, Bruce died. The early part of his career is not noteworthy, save for its inconsistency; but the later part, from the murder of John Comyn onwards, is that of a national hero fighting for the ideals of his nation and ultimately triumphing.

The early part of the reign of David II., the son of Robert Bruce, was taken up with struggles against Edward Balliol and Edward III., who reverted to the policy of his grandfather. The battles of Dupplin and Halidon Hill were lost by the Scots, and for a time it seemed as if the anarchic conditions of the Edwardian period would return. But Scotland was determined to have her independence, and ultimately Edward left Scotland to pursue his ambition in France. The policy of a Scottish alliance with France dates from the time of William the Lion. It had been prominent during the reign of Edward I., and during all the successive wars of England with France or Scotland it plays an important part. The net result of the Scottish struggle for independence was the welding together of the somewhat widely separated peoples who went to compose a Scottish nation. The war with France, although it withdrew the attention of the Eng. king from Scotland, by no means ended the struggles for independence, which, however, developed simply into a struggle on the borders. In future the border was in a constant state of war and disorder; but no great national struggle took place. The struggle for independence became nothing more serious than a series of cattle-lifting expeditions. The next 200 years of Scottish hist. is the record of disaster and disorder. The curse of Scotland was its nobility, the frequent minorities which brought in their train quarrels, and the inability of the central authority to quell disorder. For a time it seemed that the only thing which would bring anything like unity to the Scottish nation was war with England.

Up to 1337 Edward Balliol was at least nominally king of Scotland, with the support of Edward III. After him ruled David II., who was defeated and captured in 1346 at the battle of Neville's Cross, and who seems, at least, to have been ready to sacrifice the independence of Scotland which it had been the life-work of his father to establish. The reign was remarkable only for the struggles between the house of Douglas and the Ramsays. In 1371 David II. died childless. He was succeeded by the grandson of Robert Bruce, the son of Marjory Bruce and the steward of Scotland, and thus was estab. on the Scottish throne the Stuart line.

In the whole of hist. it would be difficult to find a royal house which can display such an unparalleled series of disasters. Of the first six Stuart kings one died a peaceful death, and even his reign was by no means a record of quiet and peaceful government. The Crown was continually at war with the nobles. Robert III. ruled from 1390 to 1406, and died peacefully after having first witnessed the murder of his elder son. James I., his younger son, succeeded him, and proceeded to mete out a well-deserved punishment to the murderer. But the severity of the king raised up enemies against him, and he in his turn was murdered by Sir Robert Graham after Catherine Douglas had done her best to save him. James II. ascended the throne as a boy of six. It became necessary to appoint a regent, and a regency in Scotland at this time invariably meant a continual quarrel between the nobles. The early part of the reign of James II. was seized as an opportunity for continual disorder by the great house of the Black Douglasses. The tyranny and lawlessness of the Douglasses of this period is probably only equalled by the excesses of the baronage of King Stephen's reign. Offenders against the Douglasses were punished without question. The king struggled feebly, but found himself without support. Then he adopted a different policy. The followers of the Douglasses were bribed; one by one they fell away; every opportunity was seized for dealing with the Douglasses themselves. Two were murdered in Edinburgh Castle (one stabbed by the king himself), and, finally bereft of their followers by the royal policy of bribery, they were defeated at Arkenholme in 1455. The power of the Black Douglasses was at an end. James II. died in 1460, killed by the bursting of a cannon at the siege of Roxburgh, and was succeeded by his son James III. The turbulence of the nobility reached its greatest point during this reign. No sooner had the power of the Black Douglasses been overcome than there arose in its place what was practically a coalition of the nobility of Scotland led by the house of the Red Douglas. The king tried to rule through upstart favourites; the nobles hanged these favourites and marched against the king, defeating and killing him at Sauchieburn (1488). The reign of James IV. was for the most part one of peaceful government, and yet

the greatest of all disasters in the annals of Scotland took place during this reign. The king was strong and capable. He was able to keep down the power of the baronage, but he was wilful and headstrong, and for almost no cause at all plunged his country into war. There was the usual excuse, quarrels were frequent on the border, the Eng. were no worse than the Scots, but this pretext was used for the purpose of fixing a quarrel. James IV. led an army representing a united nation into England—the best army that Scotland had produced—and there at Flodden he was met by Surrey, and, after a strenuously contested battle, defeated and slain. The battle of Flodden

Church; but James still clung to the old faith, and annoyed Henry by twice marrying Fr. wives. The differences between the countries deepened, and finally war was declared. In 1542 James attempted to invade England. At first he failed, owing to the defection of the nobility, which refused to follow him, and then, gathering an army, he was overwhelmed in the disaster of the rout of Solway. James left the field a dying man, and two days later, worn out by the shame and grief of defeat, he died at the age of thirty-one. Just before his death the news of the birth of his daughter, the future Mary Queen of Scots, was announced, and he gave utterance to the



British Railways

EDINBURGH: HOLYROOD PALACE, BEGUN BY JAMES IV.

On the north side are the ruins of the chapel of the Abbey of Holyrood, founded in 1128 by David I. Behind the palace rises Arthur's Seat (822 ft.).

left Scotland weak and unsettled; from the royal family downwards there was not one great family that had not suffered; and the death of the king again plunged Scotland into the disaster of another minority. The minority was one constant struggle for power between the queen-mother and the Red Douglas. The state of Scotland can be better understood when we reflect that fighting took place in the very streets of her cap. The Red Douglas became supreme until the king, aided by the baronage, which had grown tired of domination by the Douglas, rose against him and drove him into exile. The reign of James V. promised well. Order was restored in the country, justice was reformed, or rather reinstituted, arts and science were encouraged. The king undoubtedly had the well-being of the people at heart. But there were many signs of the coming storm. In England Henry VIII. urged James to imitate his example and despoil the

prophecy, 'It cam' wi' a lass, it will gang wi' a lass.' The death of James V. was undoubtedly a disaster. The times were troublous and needed a strong hand to dominate them. The Reformation was becoming a real thing in Scotland, and now another regency was necessary. Scotland had suffered disaster after disaster for the past 200 years, and now it seemed, just when matters were being estab. on a firmer footing than before, as if Scotland were approaching a still more troubled period. The country was backward, and compared with the greater countries of Europe, uncivilised, whilst the devastations of the nobility had prevented it from becoming rich or prosperous.

Such was the state of affairs when Mary became queen—a baby of a few days—and Mary of Guise, a Fr. and Catholic princess, became regent.

Since the time of Edward I. the policy of uniting England and Scotland had always been held desirable; now was again

created a position which had great similarity to the position in 1285 when the Maid of Norway was left as the successor to the Scottish throne. Henry VIII. advocated the marriage of his son Edward to Mary Queen of Scots. The marriage was not altogether disliked in Scotland, at whose court there was gradually growing up an Eng. party; but as was said later, the method of wooing was what was really disliked. Henry tried to force his desires on the Scottish nation at the point of the sword. He sent an army to Scotland and besieged Leith and burnt Edinburgh, but an Eng. army was defeated at Ancrum Moor. After the death of Henry VIII. the protector Somerset attempted to carry out the same policy by the same means, and was successful in battle but unsuccessful in his aim. The Eng. won the battle of Pinkie, but one of the immediate results of that battle was that the young queen was dispatched to France and there married to the Fr. dauphin, who d. in 1560. In the meantime a great reform party had arisen in Scotland. This reform party at first desired nothing more than the purifying of the Church and the estab. of their doctrine on the word of the Bible. It is important to remember that the whole of the doctrine of the Presbyterian Church appeals always to the Bible itself as its guide. The Bible, as soon as it was printed, became very popular throughout Scotland and was read by all who were sufficiently educated. Gradually it became apparent that the reform party was growing very numerous, and it was held to be necessary to make an example. Cardinal Beaton determined to execute Wishart; an attempt to murder him failed, and he was finally arrested, tried as a heretic, and burnt. His followers were infuriated. St. Andrews Castle was seized, Beaton was murdered, and the castle held against the troops of the regent for some time. Finally they were overcome and sent to the galleys in France; amongst them went John Knox. Mary of Guise, the regent, was a Catholic, and after the marriage of Mary Queen of Scots had for her support the whole of the armed power of France. This not unnaturally alarmed the Protestant party, which began to band itself together for mutual support. Knox from Geneva stirred up the nobility in the defence of the reformed religion, and finally an association was formed to lead the party of Protestantism. The Lords of the Congregation demanded freedom of worship for the Protestants of the country. The accession of Elizabeth in 1558 strengthened the hands of the reform party in Scotland, and, further, just about this time, Knox was able to return to Scotland, when he assumed the practical leadership of the reform party. The Catholic Church was attacked, the monasteries broken up, the images, pictures, and windows of the cathedrals and churches were destroyed, and finally matters reached such a pitch that it was necessary for the regent to use force. But from 1558 we may definitely hold that the Presbyterian religion was estab. The regent

was supported by troops from France. The Lords of the Congregation looked for help to Protestant England. Elizabeth never desired if possible to give help to any country outside England; further, she hated John Knox, and she disliked aiding rebellious subjects against their sovereigns; but she disliked even more the idea that Scotland should become a Fr. possession, and so furtive help was dispatched to the Lords of the Congregation. A fleet blockaded the firth of Forth, the Fr. line of communication was cut, and finally negotiations were opened which resulted in the treaty of Leith (1560). By this treaty the Fr. and Eng. were to withdraw from Scotland, and no mention was made of the religious question. The reformers, however, had won their first battle. Scotland was avowedly Presbyterian. The question of religion was, however, still far from settled. The return of Mary from France brought with it no change from the Presbyterian settlement. Mary stipulated that she should be allowed personal toleration for herself and her dependants, but the majority of the Scots still remained true to their newly adopted faith. Knox, always outspoken, offended Mary bitterly by his sermons, to many of which the queen was forced to listen. The *Book of Discipline* and the *Book of Common Order* had already been accepted as the basis of the new Scottish faith. The ministers of the gospel adopted an attitude towards the Crown which can best be compared with the anct. authority exercised by the prophets of Israel over the early Jewish kings. They were, however, men of religious and of honest and upright lives, and although they were more Calvinistic than Calvin, and stricter than any reformer had been, still they clung to their ideals, and though absolutely intolerant, they appear in the main to have followed their principles selflessly.

To such a Scotland Mary, still young and beautiful, returned. She was, however, no inexperienced ruler; her great ambition was the throne of England, and it was with this aim constantly in view that she continually schemed and plotted. As has been already remarked, she was allowed personal toleration and a private mass. The marriage of Mary was an important question, and one which needed careful settlement. Elizabeth, with her usual diplomacy, made promises which she never intended to fulfil, until finally Mary, tired of the constant scheming, and seeing a way to immediate triumph, married her cousin Darnley, of an anct. Scottish family, a Catholic claimant to the Eng. throne. The marriage for the moment thwarted Elizabeth, but Mary was herself now in the worst of hands. The characters who played important parts in her reign are now all present: Darnley, Bothwell, and Rizzio. For a time the Catholic marriage and the threat of a Catholic restoration provoked the anger of the Protestants, and in rapid succession the dramatic events of the reign were unfolded. The jealousy of Darnley and of the Scottish nobles had been excited by the favour shown to the

upstart, David Rizzio, and an opportunity was seized to break in upon him and the queen, and murder him almost in her sight. Mary's indifference towards Darnley now turned to bitter hatred, and when, early in 1571, Darnley was murdered, the house in which he lay ill (Kirk-o'-Field) being blown to pieces by gunpowder, Mary was widely accused of complicity. This suspicion was increased by her marriage with Bothwell, who certainly had a hand in the murder, within three months of the murder itself. Scotland was roused by this, and in rapid succession followed the battle of Carberry Hill, the defeat, imprisonment, and abdication of the queen, her escape from Loch Leven, the battle at Langside, and her flight into England. She remained in England until her execution in 1587 (see MARY STUART). Twenty years before this she had abdicated in favour of her son by Darnley who was born on June 15, 1566. He became king of Scotland as James VI, in 1567, and until his accession to the throne of England in 1603 the hist. of Scotland is one long tale of disorder and struggle between the king, the nobles, and the Church. It is impossible here to follow the tortuous processes of intrigue and treachery; suffice it to say that the policy of the Crown toward the kirk was the introduction of an episcopacy which would be dependent on the Crown. The kirk, as then estab., exercised and claimed powers far too great to be tolerated by a king, who, as he advanced towards years of discretion, developed his policy of divine right and laid the foundation of his belief in 'No bishops, no king.' Bishops were estab. at last in Scotland, and then, owing to the many struggles of Melville, disbanded, and the king again recognised the constitution of the Presbyterian Church. But in 1597, by means of packing the General Assembly, James was able to reintroduce an episcopacy. The episcopacy, it is true, was at first thinly disguised; the moderators of the provincial synods were to be recognised as bishops; but the king had gained the upper hand, and he fettered the Church and took away her freedom of speech and criticism.

In 1603 James succeeded to the throne of England. His own ambition was to rule as the Tudors had ruled, despotically. He did not recognise the obvious differences that there were between his own position and the position of the house he proposed to emulate. His policy in England must here be disregarded. As far, however, as Scotland was concerned he proposed an actual political union of the two countries which was rejected by both nations. Subjects, however, born in Scotland were held to be naturalised Englishmen after the accession of James to the throne. He still continued his old policy towards the kirk. General assemblies were held at his wish, and altogether he did his best to crush the Church. His Scottish bishops up to this point were, however, in his eyes but Presbyterian Moderators. Now he sent for three of them and had them consecrated by Eng.

bishops, and they in their turn 'laid hands' upon the remaining bishops. He set up courts of commission, and in 1618 he forced the famous Five Articles upon the Scottish Church. The articles were anathema to the Scots, and they could not be enforced. They would have forced upon the Scots those very things which they in their own Church had avoided: kneeling at communion, observation of Christmas and Easter, and confirmation. In 1623 the Eng. liturgy was introduced into St. Andrews, but by this time even James's advisers realised that matters were being pressed too swiftly. In 1625 James I. died. As Andrew Lang has said: 'James had sowed the wind, and his son reaped the whirlwind.'

Charles I. had all the faults of his father, and he pressed the episcopacy question even further than James. The nobility had held aloof from the quarrels of James and the kirk, since they benefited from the lands which they had seized from the Church itself and which James had recognised. But Charles reunited kirk and nobility by his policy, and so prepared the way for united action during the bishops' wars. In 1633 Charles held a parliament in Edinburgh, and in 1637 attempted to introduce Laud's liturgy. This was indeed the last straw. At St. Giles's Church the famous riot broke out known as the Jenny Geddes riot. The Church and the nobility petitioned against the liturgy, the Tables were formed, and finally the Covenant signed (Feb. 1638). Charles was forced to sanction a General Assembly, which quickly abolished all the work of James against the Church. The bishops' wars (1639-40) forced events in England itself rapidly to a head. The king, faced with the possibility of armed opposition in Scotland, was forced to call a parliament, and this failing, he called another. The Long Parliament (1640) was the beginning of the end. When England was at war with the king it demanded help from the Scots. The Solemn League and Covenant was signed, which the Scots assumed would result in the estab. of Presbyterianism in England. The Scots fought at Marston Moor, and although Montrose fought strenuously for the king, he was finally defeated at Philiphaugh. The king surrendered to the Scots at Newark, and was by them finally handed over to the Eng. on payment of arrears of pay, amounting to £200,000. Negotiations were, however, still continued by the Scots, and finally, in 1648, the engagement was entered into and the Scots marched into England to deliver the king. They were, however, utterly defeated by Cromwell at Preston (1648). The execution of the king was regarded with horror by nearly all classes of the Scots, and Charles II. was almost immediately recognised as king. Charles was approached and asked to sign the Covenants. Before, however, doing so he tried to rouse the Highlands through Montrose, who was captured and hanged, meeting his death bravely at the Grassmarket, Edinburgh. In the meantime Charles had signed the Covenants.

Cromwell invaded Scotland, won the battle of Dunbar Sept 3 1650, captured Edinburgh and controlled all S Scotland. In Aug 1651 he marched S and finally defeated the king at Worcester on the anniversary of Dunbar. During the Commonwealth Scotland and England were joined, and were administered as one country. To the extreme Puritans, Presbyterianism was as hateful as Episcopalianism and so the General Assemblies were dismissed and did not meet during the period of the protectorate. Nevertheless Scotland prospered under the rule

alteration in Church government, no liturgy was introduced, and the Shorter Catechism was still taught. Sharp, who had been the acknowledged leader of the Moderates, now went completely over to the side of the king and became archbishop of St Andrews. This somewhat mild Church policy was followed by an irritating one which exiled many ministers, and finally aroused the Covenanters to armed resistance, which was easily overcome but which could quite easily have been prevented. Middleton who ruled Scotland for the king seemed determined



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BOTHWELL BRIDGE AND THE CLYDE

The scene of the battle of Bothwell Brig. The Covenanters' monument is at the end of the bridge.

of Cromwell, the country became far more orderly, and justice was enforced.

It is not, however, to be wondered at that the Restoration was hailed with delight by the Scots. They considered that their former loyalty would be acknowledged by the king whom they had been the first to recognise, and for whom they had fought. But Scotland was doomed to disappointment. The Restoration was followed by a series of quarrels amongst the nobility of Scotland for the restoration of lands lost during the Commonwealth period. Every man of position played for his own hand, and although Lauderdale's scheme of experimenting with Presbyterianism was not successful, nevertheless, in other respects, he was successful. Episcopacy was again restored to Scotland: numerous ministers refusing to recognise it lost their livings, but as yet the change went no further than an

to crush all possible opposition. Very shortly after this Lauderdale became commissioner for Scotland. He attempted a policy of semi toleration by which certain Presbyterian ministers were allowed licences to preach. But this roused great resentment amongst the sterner sects who followed their 'outlet' ministers to the moors and hills and worshipped there. These conventicles were forbidden but the murder of Sharp and the defeat of Graham at Drumclog proved that the forces in Scotland were too small to repress the Covenanters. 'Protestant' Monmouth was finally dispatched to Scotland, and the Covenanters were defeated at Bothwell Brig. James, duke of York, was in 1681 appointed royal commissioner. The years which followed the commissionership of James of York are those which will go down in the hist. of the Presbyterians as the 'Killing' time,

especially the year 1685. The Covenanters were aiming at an ideal at once impossible and undesirable, but they fought and died for it with a gallantry impossible to deny. The stories of the persecution of 'bluidy Clavers' and of his men, and the martyrdom of the believers, will always remain dear to the Scot. James tried to exercise his power of dispensing with the laws in Scotland as he had in England, but finally came the revolution of 1688, when the throne was offered by the Scottish Convention to William and Mary. By these it was accepted, but only when the clause 'to root out all heretics' had been abandoned. Meanwhile Claverhouse roused the Highlands, won the battle of Killiecrankie, and died in the moment of victory. The Jacobite revolt in Scotland was for the time being over. In 1690 the kirk was re-established on its Presbyterian basis, and to-day the first oath which the king takes on his accession is one promising to safeguard the liberties of the Scottish Church. In 1692 occurred the infamous massacre of Glencoe, when the Macdonalds fell a prey to the hatred of the Campbells. (It may be mentioned here that in 1935 the Scottish National Trust purchased 1770 ac. in Glencoe, the scene of the massacre.)

William himself had advocated a political union, but he died before the scheme was even debated. The problem became of considerable importance during Anne's reign, since the succession had obviously to be speedily settled. The question of union was debated until it seemed as though a rupture would take place between the two countries. In March 1707 the Act of Union, however, passed both Parliaments, and received the royal assent. It declared that Scotland was to have forty-five members and sixteen elected peers at Westminster, the kirk and laws of Scotland were safeguarded, the holders of Darien stock were compensated, and the trade privileges declared to be the same for both countries. In Scotland the union was for over forty years extremely unpopular; nevertheless it was the logical consequence of natural laws. The religion and the relative position of Scotland made the union a matter of necessity. Although the Scots did not benefit fully from it for some very considerable time, the union was of real and solid advantage to the Scots of a later period—a fact which has long received recognition. Nor is it true to say that Scotland ceased to be Scotland after the union, since the national characteristics and genius have always remained essentially Scottish.

Two other events need mention here: the rebellion of the '15, a Jacobite rising, which was a failure from its inception (see STUART, JAMES, THE OLD PRETENDER), and the '45, another Jacobite rebellion, outwardly more successful than its predecessor, but nevertheless doomed to failure (see STUART, CHARLES EDWARD, THE YOUNG PRETENDER). In the half-century following the '45 Scotland was politically stagnant. Two Scottish statesmen only played any part in the united

fortunes of England and Scotland: John Stewart, third earl of Bute (d. 1792), and Henry Dundas, first Viscount Melville (d. 1811). The Tory influence of the latter, who allied himself to Pitt, predominated until his impeachment in 1805. The Fr. Revolution excited a desire in Scotland for parliamentary and municipal reform. The Hampden Club, a democratic society, found its leaders tried for sedition in 1817, and military suppression of the general strike declared in Glasgow and Paisley, April 1, 1820, resulted in what is known as the 'Radical War.' Eventually in 1832 the Scottish Reform Act was passed. By the extension of the franchise and the redistribution of the burghs, Scottish representation in Parliament was increased from forty-five to fifty-three. Scottish reforming zeal was then directed towards the Church, and Thomas Chalmers headed a movement against the lay patronage of pastors. Patronage had, however, been established by law, and the conflict became one between Church and State, culminating in the 'Disruption' of 1843, whereby the Church of Scotland split in two, and the new Free Church of Scotland was set up, not to be united again until 1929. Consequently upon the 'Disruption' a new poor law was passed in 1845, necessitated by the fact that formerly, when all inhab. had belonged to the one Church, poor relief had been administered by the kirk sessions. It was in 1845 transferred to the parish council, but by the Local Government Act of 1928 the work was taken over by the co. council. The Reform Act of 1832 was supplemented by an extension of the franchise under the Reform Acts of 1867 and 1884.

The nineteenth century is, however, not so much remarkable in Scotland for political and eccles. hist. as for the Industrial Revolution and the rapid pace at which Scotland became industrialised and prosperous. In agriculture the advance was no less noteworthy, especially in the more fertile Lowlands. In this respect the landowners set an admirable example, but in the Highlands the landowners lent their lands to the encroachments of the lowland sheep farmers and dispossessed the anc. crofter families. This dispossession of the crofter dates back to 1750, and caused wholesale emigration to America. After 1832 a strong tradition of Liberalism was established in Scotland. Between 1832 and 1910 (with the exception of 1900) Scotland returned a Liberal majority. By comparison Scottish politics have since 1910 been abnormal. Between 1910 and 1923 the Labour party increased its representation from 3 seats to 35 (84 in 1924), but in the general election of Nov. 1935 the Conservatives had 37 seats, Labour 20, Liberal Nationalist 8, Liberal 3, I.L.P. 4, Labour Nationalist 1, and Communist 1. In the election of 1945 the results were Labour 37, Unionist 25, Liberal Nationalist 5, I.L.P. 3, Communist 1, Independent Unionist 1, National 1, Independent 1. In the election of Feb. 1950 the results were Labour 37, Unionist and supporters 31, and Liberals 3.

Scotland for long suffered under an inefficient administrative machine. After the union a Scottish secretaryship of state was estab., but abolished in 1746. Scotland then fell under the control of the home secretary, who relied on an unofficial 'minister of Scotland,' or on the lord advocate. The Canning Ministry in 1827 made the lord advocate directly responsible for Scottish affairs, but later such an accumulation of business fell to the lord advocate that a secretaryship for Scotland was created in 1885; but not until 1926 was this office raised to its former position of a secretaryship of state. Scotland now by the Representation of the People Act of 1948 has a representation of seventy-one in the House of Commons, but the Scottish peers still number sixteen as at the time of the union. During the First World War Scotland bore her part gallantly, but the war was followed by a general atmosphere of dissatisfaction.

Scottish Home Rule Movement.—The desire for more local power in the administration of Scotland has long been expressed, and in 1929 the Scottish National party put up candidates at the elections and at various by-elections but was in all cases defeated. The Scottish Home Rule question was discussed in the Commons in 1932, the movement having been fostered by the belief that it might conduce to a more effective treatment of the problem of economic distress in Scotland. Opinion, however, among the Scottish members was sharply divided and the secretary of state for Scotland declared that so far as the gov. was concerned the question was an academic one, and that in his opinion a separate parliament for Scotland would be a handicap to the trade, industry, and well-being of Scotland and would be a retrograde step. He suggested that it might be possible to introduce improvements in the system of Scottish administration, in order to secure that a greater proportion of Scottish private legislation should be examined in a Scottish atmosphere in Scotland. But it was only after six years (1938) that a measure was foreshadowed for reorganising Scottish administration and centralising the gov. depts. in Edinburgh. The Second World War, however, intervened and nothing was done. The movement for home rule for Scotland received an impetus after the war when the Scottish Liberal party pub. a scheme for the estab. of a National Parliament for Scotland. This plan proposed the creation of two Houses, the Upper to consist of the lord provosts of the four chief cities and representatives of the co. councils, peerage, and univ.; while the Lower would be formed by two representatives for each of the present constituencies, elected by the system of the single transferable vote. Scotland would under this plan, however, retain representation in the House of Commons at Westminster. Powers reserved to the United Kingdom Parliament would include peace and war, the armed forces, foreign affairs, and currency. The movement again came to the fore in

March 1947 through the discontent of moderate men at that time with the treatment which Scottish affairs were receiving during the gov.'s realisation of its nationalisation plans.

Some progress towards administrative decentralisation had been made under Unionist gov.s, which urged that this process should be continued 'until all matters solely of Scottish concern are administered in Scotland.' To some, however, administrative devolution is not enough. Thus a self-styled Scottish National Assembly (March 22, 1947), organised by Scottish Convention, passed a resolution in favour of allowing the Scottish Grand Committee (in the House of Commons) to legislate for Scotland in regard to domestic affairs—a mild extension of the gov.'s own scheme for transferring the legislative process as far as possible to the committee—to which, however, there are constitutional objections. The assembly, far from being satisfied with this limited form of legislative devolution, pronounced, almost unanimously, in favour of a large measure of Scottish self-government with a parliament and gov. in Scotland, though defence, foreign affairs, customs, and major excise duties would be reserved to the United Kingdom Gov. It may be said that for many years there has been a body of opinion favourable to the realisation of some form of Scottish nationalism. In the past, however, Scottish nationalism has had no wide appeal to Scotsmen; but the changes made in the normal way of life by the Socialist Gov. undoubtedly strengthened its appeal. Scots opinion, however, will never support a theory unless it can see that the theory will work, and it is perhaps chiefly because of its breakdown on the practical side that Scottish nationalism has never really been effective. Scottish nationalists do not, however, generally advocate an independent executive for Scotland; it is a separate parliament which has been their aim, regardless, evidently, of the fact that to-day the balance of power has shifted so that the executive makes laws rather than Parliament. The demand of the extreme Scottish Nationalists for a completely separate Parliament for Scotland supreme in all matters, is a reversion to the pre-union position and makes no headway in Scotland. There is, however, a more moderate view: its advocates agree that matters connected with the Crown, defence, and foreign affairs must be left to an imperial parliament in London; they realise that customs and excise and taxation must be levied centrally; but they propose that, while the Brit. Parliament should levy taxes for the whole is., the King, Exchequer should make a bulk contribution to Scotland, based on some adjusted proportion and that a Scottish Parliament should control the spending and allocation of that contribution and should also have exclusive control over Scottish internal affairs, industry, public health, housing, education, and social insurance. At first sight this proposal seems obviously more practicable than

the wider one; but whether it would really improve the position of Scotland is open to argument (on this see articles by J. L. Clyde, K.C., in the *Scotsman*, April 1947).

Since the beginning of 1949 most Scottish newspapers have supported autonomy for Scotland in some form. Scottish Convention called a National Assembly on Oct. 28, 1949, and this resolution was passed: "This National Assembly, representative of the people of Scotland, reaffirms the belief that the establishment of a Scottish Parliament with legislative authority over Scottish affairs is necessary in the national interests of Scotland, and in order to give the people an effective means of demonstrating their determination to secure this reform, the Assembly hereby resolve to invite Scots men and women to subscribe a Covenant in the following terms: "We, the people of Scotland who subscribe this engagement, declare our belief that reform in the constitution of our country is necessary to secure good government in accordance with our Scottish traditions and to promote the spiritual and economic welfare of our nation. We affirm that the desire for such reform is both deep and widespread throughout the whole community transcending all political differences and sectional interests, and we undertake to continue united in purpose for its achievement. With that end in view, we solemnly enter into this Covenant whereby we pledge ourselves, in all loyalty to the Crown and within the framework of the United Kingdom, to do everything in our power to secure for Scotland a Parliament with adequate legislative authority in Scottish affairs." This covenant swept round Scotland like the fiery cross which summoned the clans to battle. Within six months it had received 1,250,000 signatures. Mr. Arthur Woodburn, secretary of state for Scotland, attacked Scottish convention and the covenant. He was replaced in the 1950 gov. by Mr. Hector McNeill, who said he had an open mind about the covenant.

Scotland in the Second World War.—The first impact of the war quickly came to Glasgow and neighbouring communities, for on the night of Sept. 3, 1939, 200 m. W. of the Hebrides, the Glasgow liner *Athena* was torpedoed and sunk; but the great majority of the 1400 passengers were picked up by destroyers. On Oct. 16 Scotland experienced the first air attack on Britain. Sov. German aeroplanes attempted to bomb the Forth Bridge. Fighters of the 602 (City of Glasgow) Squadron went up, and one enemy plane was shot down. As in England, civil defence services were soon organised, air-raid shelters built, balloon barrage hoisted, and a 'broom-stick' army trained, which later developed into the well-equipped Home Guard. The first bombs fell on Glasgow on July 19, 1940, but a week previously bombs had fallen in many neighbouring areas, causing damage in Greenock. On Sept. 18 a bomb burst between the decks of the cruiser *Sussex*, berthed at Yorkhill Quay,

Glasgow. Hundreds of families were evacuated from neighbouring tenements, for the bomb, a small one, had by a remarkable chance found the one vulnerable spot on the ship and penetrated to the boiler-room; but fire fighters after twenty-three hours' labour subdued the fire and saved the ship and the neighbourhood. Clydebank and Glasgow bore the brunt of the blitzes of March 13 and 14, 1941, and Greenock in May. On March 13-14 and 14-15, in Glasgow and Clydeside, 1083 persons were killed and 1602 seriously injured. On May 5-6, in Paisley, ninety-five were killed and twenty-two seriously injured; on May 6-7 in Greenock 246 were killed and 290 seriously injured. Glasgow's last experience of air attack was on March 25, 1943, when St. George's Church, Queen's Park, was destroyed by fire. In the W. dist. (Glasgow and the coos. of Argyll, Ayr, Bute, Clackmannan, Dumfries, Dunbarton, Kirkcudbright, Lanark, Renfrew, Stirling, and Wigtown) the total air-raid casualties were: killed, 1927; injured and detained in hospital, 1792. It was near a ploughman's house in the Renfrewshire outskirts of Glasgow in the Newton-Mearns-Eaglesham area that Rudolf Hess, Hitler's deputy, baled out of an Me. 110 on the night of May 10, 1941, and was taken to Buchanan Castle Military Hospital, Drymen. Three years of war saw Glasgow and Clyde become veritably 'the arsenal of the empire.' Other major achievements were the development of the Prestwick airport, the conversion of the head of the Gareloch into an Amer. shipping base, and the reconstruction of Prince's Pier, Greenock. The Kelvin Hall became an important centre for the production of barrage and convoy balloons and sea-rescue dinghies. It was from Greenock that Mr. Churchill sailed on four occasions to meet President Roosevelt. The Tall-of-the-Bank became the haven for a time of the home fleet after a Ger. submarine succeeded in penetrating the Scapa Flow defences and sank the battleship *Royal Oak*. With the S. and E. coast Eng. ports practically out of commission through bombing, the Clyde estuary became a leading shipping centre of the United Kingdom. It was up the frith that sailed the great armada, led by the battleship *Hood*, carrying the first contingent of Australian and New Zealand troops. In the van of the transports was the White Star liner *Queen Mary*, and behind her were the other great ships, *Aquitania*, *Mauretania*, *Empress of Britain*, *Empress of Canada*, and *Andes*. It was here, too, that the earlier convoy carrying the first contingent of Canadians arrived. Although concentrations of shipping were heavy, there was remarkable freedom from serious accident. The outstanding exception was the explosion on the Fr. destroyer *Maillé Breze*, which was set on fire and sunk off Prince's Pier, Greenock, after the accidental discharge of a torpedo, with a heavy death roll among the Fr. crew.

LANGUAGE AND LITERATURE.—Although in some respects the ethnological elements which go to make up the people of Scot-

land are the same in their origin as those which compose the Eng. people, the admixture has not always been the same in degree, some elements preponderating over others. Thus the Celtic, Norse, and Flem. elements preponderate in Scotland, whilst the Teutonic and Dan. are much more in evidence in England. The character of the Scottish people is, however, with the exception of the purely Celtic dists., markedly uniform and of a distinct type, and this racial uniformity, although the result of heterogeneity, has had a marked effect upon the language and literature of the race. Thus the Scottish dialect, so-called, although differing slightly in the various parts of the country, yet does not exhibit such marked diversities as do many of the dialects of England. Words of Norse and Flem. origin are abundant, but the direct origin of the dialect is the Northumbrian form of the Anglo-Saxon tongue. Some authorities have argued that Scottish is a distinct language, derived through the Gothic instead of the Saxon, and even some sixteenth-century Scottish writers, like Gavin Douglas, appear to have considered that there was a fundamental difference between Eng. and Scots. But exact philologic. research has dislaid such theories, and it is now demonstrably proven that lowland Scots is merely a dialect derived originally from the Anglo-Saxon, and exhibiting stronger connection with the archaic forms of that language than modern Eng. The older language of the country, the Gaelic, a purely Celtic tongue, is still largely spoken in the Highlands and in the W., and in the Hebrides and the outer is. generally; but it is being displaced in some parts by Eng. and lowland Scots. See also **GAELIC LANGUAGE AND LITERATURE**.

Vernacular Literature.—The earliest literature in the Scottish vernacular consists in the fragments of minstrelsy which have survived, dating back to the thirteenth century. The first Scottish poet known by name is the soothsayer, Thomas of Erceuldoune, called Thomas the Rhymer (thirteenth century). Besides traditional rhymes, to him is attributed, perhaps through confusion with the Anglo-Norman Thomas, the N. romance of *Sir Tristrem*. The next poet after Thomas in date is Huohoun of the Awle Ryale, probable author of *The Pistill of Susan* (fourteenth century). In the fourteenth century also comes John Barbour (*d.* 1395), and with his chronicle poem, *The Brus* (Bruce, 1375), Scottish poetry first takes national shape. The wonder tales of the old romances are here for the first time dispensed with, and Barbour's work is a new and original venture in Scottish literature for which he had no model. The poem tells the adventures of Bruce, the Scottish hero, and his comrades, culminating in the battle of Bannockburn. The fifteenth century was prolific in Scottish writers, beginning with James I., whose poem, *The King's Quair* (first pub. in *Poetical Remains*, 1733), frankly modelled on the works of Chaucer, is of real poetic value. To the same century

belong Robert Henryson, whose pastoral, *Robene* (also *Robynne*) and *Makynne*, the first known specimen of pastoral poetry in the Scottish language, has been compared to Spenser; Blind Harry, whose poem *Wallace*, having a similar subject to that of John Barbour, i.e. the praise of a great Scottish hero, has a great depth of patriotic feeling, though it is deficient in poetry; and, most important of all, Wm. Dunbar, the poet who comes next after Chaucer, and who has been described as the 'chief of the anct. Scottish poets.' Dunbar's works include *The Thrissil* and *the Rois* (The Thistle and the Rose) (1503), a beautiful poem to commemorate the marriage of James IV. with Margaret of England; *The Golden Targe* (1508), an allegorical piece; and the *Dance of the Seven Deidly Synnis* (before 1508). His *Lament of the Makaris* (c. 1507) is a bead-roll of the early Scottish poets before his own time. Gavin Douglas (c. 1474-1522), translator of the *Æneid* (pub. 1553), wrote two allegorical poems, *The Palise of Ho-nur* and *King Hart*. Sir David Lindsay (*q.v.*), of the Mount (1490-1555), was a noted poet and satirist. His *Ane Satyre of the Thrie Estates* (1540) was revived at the Edinburgh International Festivals of 1948 and 1949, and was hailed on both occasions as the outstanding success of the festival. To this period the finest Scottish ballads are judged to belong. Two poets at the end of the seventeenth century may be considered the last of the old Scot. poets in the vernacular before Eng. became prevalent—Alexander Scott and Alexander Montgomerie. The Scots prose writers wrote mostly in Lat. George Buchanan (1506-82) is famous for his Lat. prose, but also wrote two political tracts in the vernacular. Robert Lyndsay's *The Historie and Cronicles of Scotland from the Slaughter of King James the First to the one thousande fyve hundredth thrie scoir fyftein zeir* (c. 1565), and John Knox's *Historie of the Reformation of Religion within the Realme of Scotland* (1581) must not be omitted, but Scottish vernacular prose practically ends with King James VI. (James I. of England), who wrote *The Essayes of a Prentise in the Divine Art of Poesie* (1584) and *Daemonologie* (1597). In the seventeenth century the vernacular poetry was at a low ebb, but was revived in somewhat of an antiquarian spirit by Allan Ramsay (1686-1758). The interest in old Scottish poetry was stimulated not only by such antiquaries as the *Choice Collection* (1706-11) and *Evergreen* (1721), the last ed. by Ramsay, but also by Macpherson's *Ossian* (1762-63), that imposing literary forgery. Ramsay's chief forerunner was Robert Sempill (1595?-1665?) who in *Habbie Simson* († 1640) gave Scotland a standard verse-form. Ramsay, in addition to his pompous Eng. verse, wrote many sc. songs in the vernacular, on which his true fame rests, and which flavoured his best-known work, *The Gentle Shepherd* (1725). Ramsay had sev. followers, song-writers: Hamilton of Bangour, Rows, Skinner, Isabel Pagan, and Lady Anne Barnard.

Robert Fergusson (1750-74) is the link between Ramsay and Burns. He acted as poetic master to the latter. With Burns the revived vernacular reached its height. No poet has ever won a warmer place in the hearts of the people than Burns, and none has a better right to be placed in the very foremost rank of literary excellence. Apart from Burns, Allan Cunningham (1784-1842) and Wm. Motherwell (1797-1835) kept the vernacular alive by their anthologies and by their original work. R. L. Stevenson's (1850-94) poems in Scots were acclaimed by Scots and are considered highly to-day. Charles Murray (1864-1940) wrote excellent verse in the vernacular, but it was Violet Jacob (1863-1946) whose poems during the First World War started the Scottish Renaissance movement which has its outstanding genius in Hugh MacDiarmid (C. M. Grieve). MacDiarmid's poems in Scots have been acclaimed internationally. Among them are *Sangschau*, *A Drunk Man looks at the Thistle*, and *To Circumjack Cencrastus*. While poets such as Sir Alexander Gray, Lewis Spence, Wm. Soutar, and A. D. Mackie were writing in 'accepted' vernacular, younger men were following MacDiarmid's practice in writing *Lallans*, which has been described as synthetic Scots. The *Lallans* poets include Douglas Young, Sydney Goodsir Smith, and Maurice Lindsay. Donald Sinclair (1886-1932) was a distinguished poet in the Gaelic, and modern poets who write in the Gaelic are Sorley MacLean and George Campbell Hay. See also GAELIC LANGUAGE AND LITERATURE.

Literature in English.—When James VI. of Scotland became king of England, the court poets who migrated with him all wrote in Eng. The chief of them were Sir Robert Ayton, Sir Wm. Alexander, Sir David Murray, and Sir Robert Kerr, but Wm. Drummond of Hawthornden, one of the best of Elizabethan sonneteers, remained in Scotland, although writing in Eng. The seventeenth century produced many other Scots poets and divines, but not until the eighteenth century did Scottish literature, and especially philosophy, reach first-rate importance with David Hume, the philosopher and historian, and Adam Smith, the economist. A lesser but important philosopher, who took up the cudgels with Hume, was Thomas Reid, and a lesser historian, James Robertson. A forerunner of these men is found to be Francis Hutcheson (1694-1746), whose philosophy was allied to his divinity. To him is largely due the awakening of the Scots univ., which had a succession of fine profs. in Joseph Black, Maclaren, Simson, Alexander Monro, besides Reid and Adam Smith. Outside philosophy and the sciences eighteenth-century Scottish literature can boast Boswell's *Life of Johnson* as well as two great authors in Smollett, the novelist, and James Thomson, the poet. Burns is, of course, as famous for his Eng. works in verse and prose, although they are not so characteristically good as his vernacular. Sir Walter Scott (*q.v.*), the greatest Scottish prose-writer, was born in 1771. His

historical and romantic novels were the greatest of their kind ever written. The importance of serious periodical literature throughout the nineteenth century is associated with Scottish names. In 1802 the first number of the *Edinburgh Review* appeared, founded by Sydney Smith and Frances Jeffrey, and becoming the outlet for other Scots Whigs and men of letters—Horner, Murray, Brougham, Thomas Brown, and Thomas Thomson. Jeffrey finds a place in literature for his vigorous and wrong-headed criticism of the Eng. poets. On the Tory side of literary politics appeared *Blackwood's Edinburgh Magazine* (first number Oct. 1817). Its literary success was chiefly owing to the *Noctes Ambrosianae*, a series of discussions to which many brains contributed, but the chief of them were John Wilson (1785-1854), J. G. Lockhart, Scott's biographer (1794-1854), and James Hogg (1770-1835), known as the 'Ettrick Shepherd' and estimated as the greatest Scottish poet since Burns. A novelist encouraged by *Blackwood's* was John Galt, whose best novels were written before 1830. Susan Ferrier's best novel, *Marriage*, appeared in 1818. Michael Scott's *Tom Cringle's Log* (1833) is a work in Smollett's tradition, and one of the few Scots novels which go outside the domestic life of Scotland (Walter Scott excepted). A later *Blackwood's* man and poet is Aytoun (1813-65), but by 1850 the glory of *Blackwood's* was almost departed. The Victorian literature of Scotland is represented by Mrs. Oliphant and George MacDonald. In the natural sciences Scotland is more remarkably represented by James Clerk Maxwell (1831-79); P. G. Tait (1831-1901), and Wm. Thomson, Lord Kelvin. Lyell's *Principles of Geology* (1830) must also be mentioned and J. F. McLennan's *Primitive Marriage* (1865). Carlyle forsook Scotland for London in 1834, but his genius, which reflects the genius of Scotland, covers the whole century. Nevertheless the continuity of Scots letters was broken by the time R. L. Stevenson began writing. The two greatest Scotsmen of letters allied to Stevenson were undoubtedly W. E. Henley and Andrew Lang. The only other literary critic of their calibre is John Nichol (1833-94). Scots poetry at the end of the century is not characteristically represented in John Davidson, whose *Fleet Street Eclogues* (1893; second series, 1896) and metaphysical verse dramas place him high among the cosmopolitan *littérateurs*; but the Celtic poems and dramas of Fiona Macleod (Wm. Sharp) link Scotland with the Celtic movement in Ireland. In the literature of philosophy Scotland as previously takes a high place between 1850 and the present day, resting on the names of Edward Caird, Andrew Pattison, Arthur Balfour, and R. B. Haldane. J. M. Barrie's novels portraying Scottish prov. life created a vogue among Eng. readers which ushered in the 'Kailyard' school of writers. In its other exponents, Crockett, Ian Maclaren, 'Annie S. Swan,' the school was not so happy, and it is usual to attribute G. D. Brown's out-

standing novel *The House with the Green Shutters* (1901) to a bitter reaction against the 'Kailyard' novelists. Brown died in 1902, but he found a successor in D. S. Meldrum. Scottish poetry since the First World War has undergone important developments towards a more virile and distinguished national character. Lewis Spence, Douglas Ainslie, Rachel Annand Taylor may be mentioned. Edwin Muir is a novelist, poet and critic. Naomi Mitchison a novelist and poet. Two twentieth-century Scots writers, R. B. Cunningham Graham (1892-1936) and Compton Mackenzie associated themselves with the National party movement.

The last of the writers in the old historical style was Neil Munro (1864-1930). He is best known for his novels *The New Road* and *Doom Castle*. John Buchan, Lord Tweedsmuir (1875-1940) wrote many novels (*Priest John*, *The Thirty-nine Steps*, *Greenmantle*, etc.) and was an eminent historian. Lewis Grassie Gibbon (1901-3) was one of the first experimental writers, and the three novels which form his *Scots Quair* show that he would have developed into a great figure in Scottish literature if he had lived longer. Modern Scots novelists include Blake (*The Shipbuilders*), Neil Gunn (*Monks of Tide* and *The Silver Darlings*), Eric Linklater (*Poet's Pub*, *Tuan in America*, etc.), Guy MacKinnon (*War Fruit*), Bruce Marshall (*Father Malachy's Miracle*), O. Douglas, sister of John Buchan (*The Scots*), James Burke (four novels based on the life of Robert Burns), N. Bryson Morrison (*The Gown Storm*). Other writers of note are James Hogg, Moray MacLaren, Miriam Lochhead, J. F. Hendry and Fred Listerhart. Some of them specialise in the short story form.

Dramatists in Scotland seemed to have lost heart since the days of J. M. Barrie until James Bridie (Dr O'Hare) started writing in the late nineteenth century. Since then Bridie has become a considerable dramatist and was one of those principally responsible for founding the Glasgow Citizens Theatre. Robert McLellan (*From Byres and Jamie the Sair*), Robert Kemp (*Polmaise* and *The Scotch Singers*) and Iwan MacColl (*Tramway 23*) are the best of the young playwrights. Joe Corrie, once a miner, is the principal playwright of the great community drama movement in Scotland. The Scottish theatre, both professional and amateur, has seen a great upswing. There are now repertory companies in Glasgow, Edinburgh, Dundee, Perth, Rutherglen and St Andrews. In 1950 the Scottish Community Drama Festival attracted more than 500 entries.

ART.—Early art in Scotland was Celtic. Fine artifacts, treasured to day, are the Hunterston brooch, the Monymusk reliquary, and the brooch of Lorne. From the eighth to the fourteenth century there are fine examples of Celtic art, including illuminated MSS. such as *The Book of Deer* and the Arbutnot missal. A mural discovered in Inchcolm Abbey on an is. in the firth of Forth, has been traced to the twelfth century. There

are also intricately ornamented Celtic crosses in various parts of the country and the rich carving of the sarcophagus of St Andrews Cathedral. For painting as we know it to day we go back to the seventeenth century. The first Scottish portrait painter of note was George Jameson (1686-1644). He painted in the Flemish style and is best remembered for his portrait of the first marquess of Montrose. His pupil Joseph Michael Wright (1625-1700) went to London to achieve fame and Wm. Goussie Ferguson (1632-1693) went to the Continent thus setting an example for future generations of Scottish artists. On the other hand, Sir John B. Mydina (1633-1710) was a foreign artist who settled in Edinburgh and



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OF SIR WALTER SCOTT

In the by kroun lare t e l l i d i d

Painted the Scottish nobility. John Scougall (1643-1730) painted royalties and some of his portraits are in Glasgow Art Galleries. The first really great portrait painter in Scotland was Allan Ramsay (1713-84) son of the poet. He painted the Edinburgh celebrities of his day and was outstandingly successful with his portraits of women. Two of Ramsay's pupils, David Martin (1757-98) and Alexander Nasmyth (1758-1843) followed their master faithfully. But the next star in the Scottish sky was Sir Henry Raeburn (1756-1823). His portrait of Macdonell of Glengarry is reproduced almost every time a book on Scottish painters is published. Andrew Geddes (1758-1844) followed Raeburn and then came Sir David Wilkie (1785-1841) who set the fashion for romantic, sentimental story pictures: 'The Reading of the Will' is typical. His followers were John Philip R.A. (1816-1867), Robert Scott Lauder (1803-69), and Sir Wm. Quiller Orchardson, R.A., R.S.A.

(1832-1910). Scottish landscape painters started with the Rev. John Thomson of Duddingston (1778-1840). The outstanding landscape artists were Wm. Simpson, R.S.A. (1800-47), Horatio McCulloch, R.S.A. (1805-67), E. T. A. Crawford, R.S.A. (1806-85), Sam Bough (1822-78), and J. C. Wintour, A.R.S.A. (1852-82). The earliest impressionists in Scotland were George Paul Chalmers, R.S.A. (1833-78), and Wm. McTaggart, R.S.A. (1835-1910). McTaggart's reputation has grown with the years, and he is considered one of the finest of all Scottish painters. The famous 'Glasgow school' of artists in revolt against accepted ideas was started about 1880 and made a great impression in London and on the Continent. Their leader was W. Y. Macgregor, R.S.A. (1855-1923), and the group included Alexander Roche, R.S.A. (1861-1921), Austen Brown (1850-1924), Charles Rennie Mackintosh (1868-1928), Harrington Mann (1864-1937), Sir James Guthrie, P.R.S.A. (1850-1938), and Sir D. Y. Cameron, R.A., R.S.A. (1865-1945). Outstanding artists since the Glasgow school are John Duncan, R.S.A. (1866-1945), S. J. Peploe (1871-1935), Leslie Hunter (1879-1936), F. C. B. Cadell, R.S.A., R.S.W. (1883-1937), J. D. Fergusson, Wm. Gillies, Archibald MacGlashan, A.R.S.A., and John Maxwell. Among the young painters of to-day Wm. Crobie is outstanding.

Sculpture in Scotland was set back for centuries because religious statuary was forbidden by the Reformation. Scottish sculptors of the nineteenth century were Thomas Campbell (1790-1858), Wm. Brodie (1815-81), and Patrick Park, R.S.A. (1811-55). The great Scottish sculptor was Pittendrigh MacGillivray, R.S.A. (1856-1938), who was in the romantic tradition. Among modern sculptors are Benno Schotz, R.S.A., Thomas Whalen, and T. St. Halliday. Art galleries are to be found in all the prin. cities of Scotland; out-landing in Edinburgh are the Royal Scottish Museum, the National Museum of Antiquities, and the National Gallery of Scotland. The finest single gallery is that at Kelvingrove in Glasgow. The Burrell Collection, whose worth is estimated in millions of pounds, has recently been added to Kelvingrove, and its tapestries alone are regarded as the finest collection in the world.

THE EDINBURGH FESTIVAL.—After the 1939-45 war an International Festival of the Arts was proposed for Edinburgh, and the first, in Aug. and Sept. 1947, was an immediate success. It brought internationally famous orchestras, singers, musicians, dancers, and actors to Scotland, and also visitors from all over the world. It was typical of the post-war feeling in Scotland that Scottish people objected to the lack of Scottish performance at the Edinburgh Festival. Since then this has been remedied, and the Scottish theatre especially is fully represented in the festival.

Music.—Music is another of the arts which suffered from the Reformation in Scotland. The Stuart kings encouraged music and music-making, and James IV.

paid £10 for a song-book by Wilzean of Lithgow. The *Scone Antiphonary* dates from the middle of the sixteenth century. The St. Andrews Psalter was also produced about this period. Apart from folk tunes, little is heard of Scottish music until the eighteenth century, when the best-known composers were Thomas Alexander Erskine, earl of Kellie (1732-1781), and Charles Mackenzie (*fl.* 1737), whose work is included in 'Old English Violin Music' by Alfred Moffat. There were the Scottish fiddlers, however, who toured the country playing their own compositions. They include Daniel or Donald Dow (1732-83), Alex. McLashan (*d.* 1797), Neil Gow (1727-1807), and Nathaniel Gow (1766-1831). Wm. Marshall (1748-1833) is considered the best of the composers in his time of the Scottish dance music known as the Strathspey; his tunes were adopted for two of the best of Burns's songs. In the nineteenth century Scottish composers went to London to make their name. They included Sir Alexander MacKenzie (1847-1935), Hamish MacCunn (1868-1916), and Sir John B. MacEwen (1869-1948). The father of the modern school of composers is Francis George Scott (*b.* 1880), who has pub. sev. vols. of songs to the poems of Dunbar, Robert Burns, Hugh MacDiarmid, and George Campbell Hay. Scott went back to Scottish folk tunes for his inspiration, and so do Erik Chisholm (*b.* 1904) and Ian Whyte (*b.* 1901). Chisholm is known for four symphonies, six ballets, and a piano concerto. Ian Whyte is the conductor of the B.B.C. Scottish Orchestra, regarded as the finest in Scotland. His piano concerto was played at the first Edinburgh International Arts Festival, and he has composed ballets, two symphonies, an opera, and symphonic poems. He wrote the music for the film *Bonnie Prince Charlie*. Film music has also been written by Cedric Thorpe Davie, and his Symphony in G has been performed under such conductors as Sir John Barbirolli, Constant Lambert, and Walter Susskind. Other Scottish composers are Robin Orr, Stuart Findlay, W. B. Mooney, John McQuaid, and John Guthrie. Scotland has a number of orchestras, but the only one which has ranked with the B.B.C. Scottish Orchestra is the Scottish Orchestra, administered by the Glasgow Choral and Orchestral Union, and conducted by Walter Susskind. It has disappeared since a new Scottish National Orchestra, guaranteed by the four prin. cities of Scotland and the Arts Council, has been formed.

Bagpipe Music.—Bagpipe music is still immensely popular in Scotland, but there has been little outstanding in bagpipe composition since the eighteenth century. The bagpipes are highland (Pìob Mor) and consist of a bag with five pipes fitted into it. The three drones lie over the shoulder when the piper is playing, one pipe leads to the mouth, and the fifth pipe is the chanter, for the finger work. Bagpipe music is divided into Ceol Mor and Ceol Beag. Ceol Mor is the classical form of pipe music and is generally known

as Pìobaireachd (pronounced 'pibroch'). Ceol Beag includes reels, strathspeys, and other dances. Lowland folk song has been considerably influenced by Ceol Beag.

RELIGION, *see under* HISTORY above; SCOTLAND, CHURCH OF.

EDUCATION, *see under* EDUCATION.

JUSTICE, *see* COURT OF SESSION; JUDICIARY, HIGH COURT OF.

LAW, *see* SCOTS LAW.

LOCAL GOVERNMENT, *see* LOCAL GOVERNMENT, Scotland.

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Scotland, Church of, was founded by John Knox and Andrew Melville on the teachings of Calvin, and formed into a Presbyterian Hierarchy of Courts in contradistinction to the Episcopal Hierarchy of men. On Dec. 20, 1540, the first Assembly of the C. of S. was held, and the Confession of Faith, drawn up by John Knox, was ratified. In 1592 the Act, guaranteeing the liberties of the C. of S. and sanctioning its Presbyterian gov., was passed. When James of Scotland became king of England, and during the reign of Charles II., presbytery was discountenanced by law in favour of episcopacy, and not until 1690, in the reign of William III., was the Act of 1592, the Charter of the C. of S., restored to its full position. The gov. of the C. of S. is by kirk-sessions, presbyteries, synods, and the General Assembly, the supreme court. The kirk-session consists of the parish minister and ruling elders, elected by the congregation. The presbyteries are elected by the General Assembly, and consist of all parish ministers in a specified dist. The prov. synods, of which there are twelve, are comprised of three or more presbyteries. The presbyteries elect the ministers who sit in the General Assembly. By an Act of Union, Oct. 3, 1929, the C. of S. was united with the former United Free C. of S. to form the united C. of S. Statistics of the two churches prior to union show

759,625 communicants in the C. of S. and 538,192 in the United Free Church, with 1457 par. churches in the former and 1441 congregations in the latter. There are now 1,250,000 communicant members. See *The Church of Scotland Year Book* (ann.); also A. R. MacEwen, *History of the Church in Scotland*, 1913-18; J. Buchan, *The Kirk in Scotland*, 1935; and W. E. Brown, *Reformation in Scotland*, 1936.

Scotland Yard. New S. Y. is the headquarters of the Metropolitan Police Force, and is situated on the Victoria Embankment, London. It is popularly known as S. Y. from the fact that the old headquarters were in S. Y., off Whitehall, from New S. Y. the commissioner directs the organisation of the Metropolitan Police. He is assisted by a deputy commissioner, four assistant commissioners, and seven commanders (four of whom are dist. commanders) with a secretarial staff of civil service clerks. Each assistant commissioner is in charge of a dept.: 'A' (administration, including discipline, promotion, assistance at meetings and processions, enforcement of the gaming and licensing laws); 'B' (traffic and transport, licensing of public service vehicles); 'C', the Criminal Investigation Dept., including the Criminal Record Office, Special Branch, and Police Laboratory; and 'D' recruitment, training, medical, and communications). There are also statistical, secretarial, and legal branches. The Lost Property Office is now in a separate building across Westminster Bridge in Lambeth, and deals only with property found in taxis or in the streets. Other lost property is handled by London Transport Executive's lost property office.

In recent years great advances have been made in the use of speedier methods of combating crime, largely by greater use of mechanisation and of wireless. The '999' emergency system enables a police car to reach the scene of a crime within a minute or two of the alarm having been given. S. Y. is also linked by radio with other forces all over the world. Metropolitan Police vehicles cover nearly 14,000,000 m. per year. See Sir J. Moylan, *Scotland Yard*, 1929; Sir C. W. Thomson, *The Story of Scotland Yard*, 1935; H. M. Howgrave-Graham, *Light and Shade at Scotland Yard*, 1947.

Scotomata, see under VISION, DEFECTS OF, *Sight-testing*.

Scots Fir, see PINE.

Scots Fusilier Guards, see under SCOTS GUARDS.

Scots Fusiliers, Royal, oldest Brit. fusilier regiment and second oldest Scottish regiment of foot, raised in 1676 by Charles, fifth earl of Mar, for the suppression of lawlessness within the kingdom. Its composition from the outset seems to have been mainly Lowland, and for the next ten years the 'Earl of Mar's Grey-brecks' (so nicknamed from their hodden grey uniform) were engaged throughout Scotland in garrison or detachment duty. In 1684 they were sent to Holland for service against the Fr. They then became the 21st Foot, and have carried that designation since that time. In Marlborough's

battles the R. S. F. won fame at Blenheim and at Ramillies. In 1709 they were employed in covering the forces besieging Mons, where the 1st Battalion again fought in 1911. They were at Dettingen (1743), the last action in which a Brit. king commanded. Their next battles were Culloden, Bergen-op-Zoom, Bladensburg, and the capture of Washington. During the Napoleonic wars a 2nd Battalion was raised, but disbanded in a few years to be raised anew in 1853 for the Crimean war. Their next battles or campaigns, after the Crimea, include Ulundi, Potchefstroom (1880), the Tirah campaign, Colenso, and the relief of Ladysmith. Various battalions of the expanded regiment were conspicuous in most of the big battles of the First World War. A handful of the 1st Battalion made a heroic stand at Jemappes in 1914, winning the praise of the Gers. Other battalions fought in Palestine and at Salonika. The regiment served (1939-45) in N.W. Europe, Italy, Hong Kong, and Burma. In Burma they fought with the 36th Brit. Div. which formed part of an Amer. formation under Gen. Sultan. After capturing the railway tn. of Pinbaw, the R. S. F. marched for two months through dense jungle full of Jap. snipers, covering a distance of 100 m. After helping to clear N. Burma the R. S. F., with other Scottish troops, advanced down the Irrawaddy, and eventually eastwards towards the Shan States. Other units took part in the Second Army's operations on the Rhine in 1945. The 11th Battalion was part of the 49th Territorial Div., and was conspicuous in breaking the Ger defences at Fontenay and Tilly in the battle of Normandy and in the Nimegen fighting.

Scots Greys, see GREYS, SCOTS.

Scots Guards. At the outbreak of the Civil war Charles I. commissioned Archibald, marquis of Argyll, to raise a regiment for service in Ireland, where it served until 1645. It served Charles II. at the battles of Dunbar and Worcester (1651). The regiment then practically ceased to exist until the restoration, when it was re-formed, and served against the Covenanters. Under William III. it served at Landon and Namur in 1712. It became the 3rd Foot Guards, under which title it fought at Dettingen and Fontenoy in the war of Austrian Succession. In the Amer. War of Independence two of its companies formed part of the composite Guards battalion which went out to the colonies. It served against Napoleon in Egypt and in the peninsula, and the 2nd Battalion was present at Waterloo, and was prominent in the defence of the farm of Hougoumont. During the early nineteenth century the title was amended to 'Scots Fusilier Guards,' but the original title was restored in 1877. The regiment took part in the Crimean campaign, not only at the siege of Sebastopol and the battles of Inkerman and the Heights of Alma. Both battalions served on the W. Front in the First World War. In the spring of 1940 the regiment was represented in the expedition to Norway, and battalions also fought with the Eighth and

First Armies in Africa and Italy, one of them forming part of the 21st Guards Brigade incorporated in the 6th S. African Armoured Div.

Scots Law. Scotland, at the time of the Union with England, retained its old legal system and its legal administration which, based as they were on Fr. principles, were in marked contrast to those of the sister country. Until about the beginning of the sixteenth century Scots and Eng. law did not greatly differ. Thereafter and through the Reformation, came a change. Scotland began to develop her national life and institutions with a greater self-consciousness and to move away from England towards a system of law by which the better to express her outlook on life and her natural genius. For political and religious reasons, and because so many of her intellectual sons were exiled in Holland and in France, she gradually adapted to her own needs many legal principles taken from those countries, and in turn from the civil law. Since the Union, however, the S. L. has been closely assimilated in many branches to the Eng., but Scots legal procedure remains different. The criminal law of Scotland is almost identical with that of England, but although there are many points of contact between Eng. and S. L. in the branches of the civil law, there are also many points wherein they differ fundamentally. In both countries the common law developed, through judicial decisions, on roughly similar lines; while the main principles of the law of evidence are identical and there is a tendency for Scots judges to make increasing use of Eng. case-law. But as regards substantive law S. L. and Eng. law show a much more striking resemblance in modern than in old branches, for example in both countries the law of patents, trade marks, bills of exchange, and negotiable instruments are nearly identical, and this is always noticeable in regard to modern statutory law. But the systems diverge radically in land laws and conveyancing, for the good reason that feudal holding is the foundation of the Scots law of heritage; but there are many similarities, as, for instance, in riparian boundary law and the ownership of the soil under a highway. Yet the S. L. of marriage, parent and child, prescription and succession, is quite dissimilar in spite of some analogies, and the same remark applies to Scots procedure and arbitration.

As regards the law of persons, the following points are of importance: the Married Women's Property (Scotland) Act, 1920, assimilated the S. L. to the Eng., in respect of the disposal by a married woman of her separate estate and the husband's right of administration was abolished, while his consent to his wife's disposal of her heritable estate was no longer necessary. Further, his rights of succession to his wife's moveable estate became co-extensive with her reciprocal rights in his estate and cannot be defeated by will (*see* Law Reform (Misc. Provs.) Scotland Act, 1940). A Scottish will is no longer revoked by the subsequent marriage of the testator, but

the subsequent birth of a child may revoke a will in whole or in part. Changes in the Scottish marriage law came into force on July 1, 1940, when marriages by declaration, including the 'Gretna Green' ceremony and marriages by declaration before a sheriff, were abolished. The only recognised forms of marriage are now those by a minister of the church, marriage before a registrar, and the ant. 'marriage by habit and repute,' the legality of which must be estab. by a declaration from the court of session. Marriage, in S. L., is a civil contract, and like other contracts may be dissolved on evidence of breach, based on two grounds, adultery and desertion; but the evidence of these defaults must be genuine and not collusive. In short, the parties must be at arm's length. Once this position is estab., and the evidence convinces the court, S. L. proceeds with dispatch and without equivocation to bring the contract to an end. Other grounds of divorce in S. L. are cruelty, incurable insanity, and unnatural sexual offences. Despite the changes in England by the Matrimonial Causes Act of 1938, the tardiness of remedy remains. But in Scotland, once the decree is made, the parties may marry again within ten days. As to the law of parent and child, the S. L. as to legitimation *per subsequens matrimonium* has now been adopted by Eng. law (*see* LEGITIMACY, LEGITIMATION), but the S. L. as to the legal capacity of infants and on minority is far from similar, e.g. there is in S. L. a distinction between pupils and minors which is unknown to Eng. law. The S. L. of intestate succession is entirely different from the Eng., although the old law of heritable succession is still applied for certain purposes, and its rules have a marked resemblance to the rules of Eng. conveyancing law. In regard to succession in moveables (personal property) S. L. knows not the doctrine of 'cutting off with a shilling,' so marked a feature, at least until 1938, in Eng. life and fiction.

As regards the law of things, there are wide distinctions to be noted in respect of the S. L. of contracts, especially in relation to the doctrine of consideration. The principles of offer and acceptance and the interpretation and consequences of a contract are common to both systems (*see* CONTRACTS); but the S. L. on the evidence of the formation of a contract does not follow the Eng., and it diverges fundamentally on the characteristic Eng. doctrine of consideration (*q.v.*), e.g. the maxim *ex nudo pacto non oritur actio* has no application in S. L. In Eng. law, no contract (apart from a deed) is binding without consideration, but in S. L. a one-sided obligation is valid if proved by writ or oath. Again, in Eng. law performance by one party of what is already due under a contract is not valuable consideration for an additional promise, and a promise by the other party in return for such performance is void for want of consideration; but in S. L. such a promise is valid even if it be held to be unilateral. Again, in S. L. every stipulation in a mutual agreement is binding on the person obliged,

whether it be made in favour of the other contracting party or of some third party; whereas in Eng. law the time-honoured rule is that consideration must 'move from the promisee' or, in other words, the contract can be enforced only by a party whose act or forbearance constitutes consideration. S. L. and Eng. law on the sale of goods are closely assimilated by the Sale of Goods Act, 1893 (see SALE), but the two systems were not entirely assimilated by that Act, the remaining differences being necessitated by various branches of common law in Scotland, e.g. the Eng. law on what constitutes 'necessaries' does not apply to Scotland (see *under* INFANT; HUSBAND AND WIFE). In Eng. law, again, the price in a contract of sale may be left to be fixed as specifically agreed in the contract; but in S. L. the price may validly be left to one or other of the parties to be fixed by him, subject, however, to the power of the court to correct any grossly inadequate price. Again, the Eng. distinction between 'conditions' and 'warranties' is not known in S. L. (see CONDITION; WARRANTY). The analogy in S. L. to 'specific performance' is 'specific implement,' and the Sale of Goods Act expressly safeguards the S. L., which is a universal right, for, wherever performance is possible of enforcement, the contracting party is as entitled to have it compulsorily carried out as he is to recover equivalent damages if he so elects; whereas in Eng. law the doctrine of specific performance is peculiarly the creation of equity (*q.v.*).

In the S. L. of delict or reparation, the principles are closely analogous to those of the Eng. law of *tort* , and Eng. decisions are relied on by the Scots courts, e.g. the law of negligence in general, as construed in England, is applicable in Scotland, and the S. L. recognises this community of principle in numerous heads of reparation, as, for example, in cases of nuisance, trespass, damage caused by animals, malicious prosecution, and the doctrine of 'common employment' (see WORKMEN'S COMPENSATION); but among the most striking differences is that in seduction, for in S. L. the typically Eng. action, *per quod servitium amisit*, has no application (see SEDUCTION).

In the domain of criminal administration there are inequities in Eng. procedure and practice which have not their counterpart in Scotland. The Scottish person accused of crime has not had to face semi-judicial inquiries and their publicity, before being tried in the high court of judicatory. No coroner exists in Scotland, and no coroner's jury sits. No magistrate inquires whether there is a *prima facie* case. All that the magistrate does is to perform certain formal acts. At the actual trial the last word is with the accused (or his counsel) whether or not he has given evidence.

For a concise statement of the principles of Eng. law which should be known to Scots practitioners consult *Green's Encyclopedia of the Laws of Scotland* (consulting editor, Viscount Dunedin), 1923. See also COURT OF SESSION; JUSTICIARY,

HIGH COURT OF; SHERIFF AND SHERIFF COURTS; and, for individual branches of S. L., see *under* the various heads, HERITABLE AND MOVEABLE; HERITABLE JURISDICTION; HERITOR; FEU AND FEU-DUTY; POINDING; TEINDS, etc.

'Scotsman,' leading Scottish daily, estab. in 1817, one of the founders being Wm. Ritchie, a solicitor before the supreme courts, and an extremely versatile journalist. Ritchie projected the paper with Charles Maclaren (with whom he acted as joint-editor till his death in 1831) as a medium for the furtherance of Liberal reforms. Another contributor to the foundation of the S. was John Ritchie, who subsequently became sole proprietor and later took John Ritchie Findlay into partnership. The firm's name, John Ritchie & Co., was changed to the Scotsman Publications Ltd., in 1939, and the paper is still privately owned. At first a weekly it was converted into a bi-weekly in 1823, and then in 1855 issued as a daily. An office was opened in Glasgow in 1872 to enable simultaneous pub. in the two cities. The London office with an editorial staff in Fleet Street was estab. in 1868. The handsome head office in Edinburgh took nearly seven years to build and cost over £450,000. The paper, always a pioneer in technical development, has a typesetting equipment between its London and Edinburgh offices. Its most famous editor (1846-76) was Alexander Russell, but many distinguished Scottish writers have contributed to its columns. It publishes special articles on Scottish life, literature, hist., science, and natural hist. It circulates throughout Scotland and north of England.

Scots Money, see *under* WEIGHTS AND MEASURES.

Scots Pine, see PINE.

Scots Water, see FORTH.

Scott, name of a famous border family, said to have had its origin in a certain Uchtreid Filius Scotti, or Fitz-Scott, a witness to David I.'s charter to Holyrood Abbey (1128). Another member, Richard S. of Murthockstoun, swore fealty to Edward I. for his lands in Selkirk (1296), including probably Buccleuch, which was certainly in the hands of the S. family in 1415. Branzholm, near Hawick, was acquired between 1420 and 1446, and Sir Walter S., of Buccleuch, received a large share of the forfeited Douglas estates as a reward for the help rendered to James II. at Arkenholme. His descendants were created Lord S. of Buccleuch (1606) and earl of Buccleuch (1619), the latter's granddaughter, Mary, being succeeded by her sister Anna, who married James, duke of Monmouth, known afterwards as the duke of Monmouth and Buccleuch. Anna was succeeded by her grandson, Francis, who married a daughter of the duke of Queensberry, that title and estates in Dumfriesshire devolving on Henry, third duke of Buccleuch (1746-1812). Walter Francis, fifth duke (1806-84), was the founder of Granton. The families of Sinton, Harden, Highcheaters, and Raeburn were descended from John S., said to have

been a son of Michael S., of Murthookstown. Walter S., the son of Sir Gideon S., of Highchesters, married Mary, countess of Buccleuch, in 1659, and his great-grandson was the fourth Lord Polwarth. The Ss. of Ræburn, ancestors of Sir Walter S. (1771-1832), the novelist, were descended from Sir Wm. S., of Ilarden (d. 1655), whose son was Walter S., of Ræburn.

Scott, Charles Prestwich (1840-1932), b. at Bath, one of the greatest figures in Eng. journalism, and the maker of the *Manchester Guardian*, was the younger son of Russell S. He was educated privately and at Corpus Christi College, Oxford, gaining first class honours in the final classical school, 1869. After gaining experience under Alexander Russell (on the *Scotsman*), he joined the *Manchester Guardian* in 1871. He was its editor for fifty-seven years (1872-1929), a record in journalism. His name was familiar in every newspaper office. He became proprietor of the *Guardian* in 1905, and governing director on his retirement from the editorship. As a Liberal he contested E. Manchester at the general elections of 1886 and 1892, and at a by-election in 1891, and was M.P. for the Leigh div. of Lancashire, 1895-1906. His great work was to make a prov. newspaper a world force. Liberals accepted his newspaper as a mentor: political opponents respected his determination to give accurate news and to be fair in controversy. S. regarded his paper as a spiritual entity, not a commodity, and no consideration of expediency induced him to swerve from expressing his opinions honestly, whether they were popular or otherwise. He strenuously opposed the S. African war and the policy of coercion in Ireland; he was an undeviating supporter of Home Rule and of woman suffrage, when once convinced of the justice of these causes. One source of his influence was the excellence of the *Guardian* as the authority on the cotton trade, and in great controversies such as Free Trade versus Tariff Reform and the Boer war opponents had to read the paper to secure essential facts. He introduced and encouraged many brilliant writers in journalism, and by his precept formed what has been called the *Guardian* school of writers. One of the best known of these was C. E. Montague. When S. retired from the editorship in 1929 he received from the king a letter of congratulation on his life's work. In 1930 he received the freedom of Manchester. He was also an honorary LL.D. of Manchester Univ. and one of its governors. See life by J. L. Hammond, 1934, and C. P. Scott, 1846-1932: *the Making of the 'Manchester Guardian'*, 1947.

Scott, Cyril Meir (b. 1879), Eng. composer, b. at Oxtou, Cheshire. A pioneer in the modern Eng. school, he is best known for his songs, delicate arrangements of folk tunes, and pianoforte pieces. He studied in Germany, and then settled in Liverpool. His *Heroic Suite* (1900) was performed at Liverpool and Manchester, and his first symphony at Darm-

stadt. He has also composed three operas, *The Alchemist* (1925), chamber and orchestral music, and is a highly capable pianist.

Scott, Duncan Campbell (1862-1947), Canadian poet and writer, b. in Ottawa, son of a clergyman of Lincoln, England. Lifelong service in the dept. of Indian Affairs gave him a wide knowledge of Indian habits, customs, and traditions, which profoundly influenced his poetry and other literary work. He wrote short stories, historical studies, and plays, but is chiefly known as Canada's poet laureate, being regarded as the greatest technician in verse that Canada has produced. Such pieces as *Night Burial in the Forest* and *Half-breed Girl* are among the best in Canadian poetry. His *The Magic House* (1893), *Labour and the Angel* (1895), *New World Lyrics and Ballads* (1905), and other collections and plays have given him a wide reputation. His *Complete Poems* were pub. in 1926. His last book, *The Green Cloister*, appeared in 1935. It seems to be generally agreed that no Canadian writer has surpassed his short stories *In the Village of Viger* (1896), and that no single poem has surpassed *The Piper of Arl*, which earned the enthusiastic praise of John Masefield. S. owes something to the influence of Archibald Lampman, Canada's nature poet, but is by far the greater craftsman with greater spiritual insight and wealth of ideas.

Scott, Sir George Gilbert (1811-78), Eng. architect, b. at Gavecott, Buckinghamshire. He was a pupil of Sir Robert Smirke, and later practised in partnership with W. B. Moffat, but about 1840 he became a leading spirit of the Gothic revival, and restored many churches and cathedrals, beginning with Chesterfield church. In 1847 he was appointed architect for the restoration of Ely Cathedral, and subsequently for the cathedrals of Hereford, Lichfield, Salisbury, and Ripon. He was also appointed architect for the India Office (1858), and afterwards for the Home and Colonial offices, and in 1864 built the Albert Memorial. He designed St. Pancras station and hotel, London (1865), the building of Glasgow Univ., the Martyrs' Memorial at Oxford, Preston n. hall, and the Episcopal cathedral at Edinburgh. He was prof. of architecture at the Royal Academy from 1868, and was knighted in 1872. He wrote sev. works on architecture.

Scott, Sir Giles Gilbert (b. 1880), Eng. architect, son of George Gilbert S., and grandson of Sir George Gilbert S. He was educated at Beaumont College, near Old Windsor, and began practice in 1902. His Gothic design was accepted in 1903 for the new cathedral of Liverpool; S. became an R.A. in 1922, and he was knighted in 1924. Other churches he has built include St. Manghold's, Ramsey, Isle of Man, St. Paul's, Derby Lane, Liverpool; Our Lady's, Northfleet. He has also designed new buildings at Clare College, Cambridge; new chapel at Charterhouse School; new nave at Downside Abbey; extensions to the Bodleian library and to

Magdalen College, Oxford; the new Cambridge Univ. library; the new Waterloo Bridge; and the new House of Commons. He was president of the A.R.F.B.A., 1933-1935. He was awarded the O.M. in 1914, and the gold Albert medal of the Royal Society of Arts for 1919.

Scott, Hugh Stowell, *see* MERRIMAN, HENRY SETON.

Scott, John, *see* ELDON, JOHN SCOTT, FIRST EARL OF.

Scott, James Robert Hope-, *see* HOPE-SCOTT.

Scott, Sir Leslie Frederic (1869-1950), Brit. jurist, son of Sir John S., K.C.M.B., b. at Hornsey, educated at Rugby and New College, Oxford. Called to the Bar 1894, and became solicitor-general in 1922; Conservative member for Exchange div., Liverpool, 1910-25; privy councillor, 1927; chairman of sev. gov., political, and legal commissions; lord justice of the court of appeal, 1935-48. He was chairman of the Agric. Organisation Society from 1917 to 1922, and of the Acquisition of Land Committees during the same years, whose reports led to the passing of the Acquisition of Land (Compensation) Act, 1919, the Mines (Working Facilities) Act, 1923, and the new Law of Property Acts, which latter effected a number of valuable reforms and at the same time did away with many archaic incidents of land tenure. He will, probably, be chiefly remembered for his chairmanship, in 1941-1942, of the committee upon land utilisation in rural areas. This resulted in the S. Report, which, together with the Barlow and Uthwatt reports, have led to a new conception of town and country planning. *See further under TOWN AND COUNTRY PLANNING.*

Scott, Michael (1789-1835), Scottish author, b. at Cowliars, Glasgow. He went to Jamaica in 1806, and in 1810 entered business at Kingston, which involved frequent journeys by sea and road, the result of which was the brilliant *Tom Cringle's Log*, first pub. in *Blackwood's Magazine*, 1829-33. His story, *Cruise of the Midge* (1842), was founded on the 'Shark Papers,' now in the Institute of Jamaica at Kingston, so named because vital evidence in a salvage suit of 1799 was secured when a shark was caught which had swallowed the jettisoned ship's papers in the case.

Scott, or Scot, Michael (c. 1175-1234), Scottish scholar, was attached to the court of the Emperor Frederick II., to whom he was tutor and astrologer. He is alluded to by Dante in the *Inferno*, and by Sir Walter S. in the *Lay of the Last Minstrel*, and appears to have been celebrated all over Europe as a magician. He pub. trans. and wrote works on astronomy and alchemy. *See* H. H. Milman, *Michael Scott: almost an Irish Archbishop*, 1854, and J. W. Brown, *Life and Legend of Michael Scott*, 1897.

Scott Report, *see under* TOWN AND COUNTRY PLANNING.

Scott, Robert (1811-87), dean of Rochester, b. at Bondleigh, Devonshire. He was prebendary of Exeter (1845-66), Dean Ireland's prof. of exegesis (1861-70), and dean of Rochester (1870-87). He colla-

borated with Dean Liddell in the *Greek-English Lexicon*, pub. 1943.

Scott, Robert Falcon (1868-1912), Eng. explorer, b. at Outlands, Devonport. He entered the navy, 1882, and became commander in 1900. He organised the national Antarctic expedition of 1900-4, when he explored the ice foot from Macmurdo Sound to 82° 17' S., a separate party making a determination of the S. magnetic pole. Appointed captain in 1901, he wrote *The Voyage of the 'Discovery'* in 1905. In 1910 he sailed again for the Antarctic in the *Terra Nova*, and reached the S. pole on Jan. 25, 1912, with Capt. Oates, Dr. Wilson, Lt. Bowers, and P.O. Evans. The return journey was marked by ill-luck, and the non-arrival of the party necessitated the stay of the ship for another winter. In the following spring a search-party discovered the tent and bodies of four of the explorers only 11 m. from safety. All papers and instruments were recovered. Scott's last message to the Brit. public and the record of the failure rank with the noblest stories of Britain's traditional heroism. His wife received the title of Lady Scott, which would have accompanied the knighthood had her husband returned alive. In 1922 she married Sir E. Hilton Young, later Lord Kennet, and died in 1947. His records were ed. by L. Huxley (1913).

S.'s son, *Peter Markham Scott* (b. 1909), is well known as a naturalist and painter of birds; in the Second World War he became a lieutenant-commander in light coastal forces and destroyers.

See H. G. Ponting, *The Great White South*, 1921; E. R. G. R. Evans, *South with Scott*, 1921; and S. Gwynn, *Captain Scott*, 1932.

Scott, Sir Walter (1771-1832), Scottish novelist, historian, and poet, was b. in Edinburgh, his father being a lawyer there. The S. family claimed connection with sev. noble houses. As a child Walter contracted an illness which affected his power of walking, and in hopes of curing him his parents sent him for a while to Bath, but the malady proved to be incurable, and till the end of his days he was slightly lame. He was educated at the high school of Edinburgh, where he showed little taste for learning, yet enjoyed great popularity among his fellow pupils; while subsequently he entered Edinburgh Univ., and on leaving it he decided to become a lawyer. Called to the Bar in 1792, he was married five years later to Charlotte Margaret Charpentier, whom he met while travelling in the Eng. lake dist., and thereafter the couple took a house in Edinburgh, yet lived often at a cottage in the neighbouring vil. of Lasswade. In 1799 S. was appointed sheriff-depute of Selkirkshire, while the same year was marked by a more momentous event, the pub. of his first book. This was a metrical trans. of Bürger's *Lenore*, and it drew considerable attention to the young writer, while three years later, on his issuing the *Minstrel of the Scottish Border* (2 vols.), consisting of old ballads he had collected in the borders, popular interest in him began to grow

apace. Meanwhile he was busy with more original work, and in 1805 he pub. a long narrative poem, *The Lay of the Last Minstrel*, while in 1808 he followed this with a kindred work, *Marion*, succeeded in 1809 by *The Lady of the Lake*. These metrical tales had an instant and wide success, and brought their author considerable wealth. In an ill-starred moment he supplied half the capital for starting the publishing house of Ballantyne, and in 1812 he went to live at Abbotsford, near Melrose.

S., however, was not destined to devote himself exclusively to verse. His first



N.P.G.

SIR WALTER SCOTT

The painting by Landseer, 1821.

novel was *Waverley*, issued anonymously in 1814. It was followed by *Guy Rannering* (1815); *The Antiquary* and *Old Mortality* (1816); *The Heart of Midlothian* (1818); *Ivanhoe* (1820); and *The Monastery* and *The Abbott* (1820). They were read far and wide, evoking almost as much enthusiasm in France as in England, and though, for some reason which has never satisfactorily been explained, the novelist abstained from disclosing his name, the secret of their authorship soon became known everywhere, and in 1820 S. was created a baronet. In the same year he was elected president of the Royal Society of Scotland, while Abbotsford began to attract pilgrims from far and near. Yet his popularity did not weaken his skill, and in 1821 he pub. one of the greatest of all his works, *Kennilworth*. Between 1821 and 1828 S. wrote many novels, some of the most popular being *Quentin Durward* (1820); *Redgauntlet* (1824); *The Betrothed* and *The Talisman*

(1825), and *Chronicles of the Canongate* (first series, 1827).

Misfortune now overtook him. In 1826 the firm of Ballantyne was made bankrupt. He declined all offers of help, and undertook to work off his own debts. Writing with his accustomed speed he produced *The Fair Maid of Perth* (1828) and *Anne of Geierstein* (1829), both of them among his finest stories. He compiled also a life of Napoleon (1827), and in the same year he pub. the first series of his *Tales of a Grandfather*, a hist. of Scotland. The second series followed in 1828; yet the author's powers were falling and his last two novels, *Castle Dangerous* (1832) and *Count Robert of Paris* (1832), are much inferior to their predecessors. S.'s health, moreover, was beginning to give him grave cause for alarm, and he went to the Continent in hopes of recuperating. The journey, however, exhausted him, and he returned home to die. S. was buried at Dryburgh Abbey.

Abbotsford is still a private residence. It contains the novelist's library, his antiquarian collection, and a portrait of him by Raeburn.

S. exerted a strong influence on the intellectual life of his country. Before his time Scottish hist. was virtually an unworked mine, but among the results of the Waverley novels was the founding of numerous learned societies, in particular the Bannatyne and Abbotsford clubs, whose members made it their business to exhume and publish documents illustrative of Scotland's past. S. also materially affected the literary movement of his time: his unconventional manner of writing and his total freedom from the academic point of view were largely instrumental in arousing France to that Romantic movement which brought writers like Hugo, de Musset, and Gautier, and painters such as Diaz, Dupré, Corot, and Millet.

S. was the creator of the historical novel, combining the naturalness and realism of Fielding and others with the historical and romantic element of adventure and the marvels of superstition. Critics have suggested that the historical romance had a damaging effect on the writing of hist. as exemplified by Carlyle's *French Revolution*. But S. himself never confounded fiction and hist., though he took the greatest liberty with facts. His hist. were written in the restrained spirit of a Hume, and indeed later writers have surpassed S. in the art of imbuing their novels with a certain archaic colour. S.'s interest was in character and passion. In this field of hist. his greatest triumphs were won in novels with a background of seventeenth- and eighteenth-century Scotland. It has been said that his closest affinities were not with the romantic novelists of his time, but with the great eighteenth-century novelists and their predecessor Cervantes (Sir Robert Grierson).

The standard biography of S. is by his son-in-law, Lockhart, pub. in 1837 (reprinted in Everyman's Library), but the reader should also consult the novelist's

own jour., while Andrew Lang's notes to the Border ed. of the Waverley novels embody much interesting and erudite matter. See lives by J. G. Lockhart, 1837-38, 1839; G. Gilfillan, 1870; G. Saintsbury, 1897; A. Lang, 1906; O. Elton, 1924; J. Buchan, 1932, 1947; and H. J. C. Grierson, 1938. See also J. Hogg, *The Domestic Manners and Private Life of Sir Walter Scott*, 1834; D. Douglas (ed.), *Journal*, 1825-32, 1890, and *Familiar Letters*, 1893; A. Caplan, *The Bibliography of Sir Walter Scott*, 1928; M. Bayne, *Sir Walter Scott: the Wizard of the North*, 1931; E. T. Pagan, *Scott and his Times*, 1935; Sir H. J. Grierson, *The Story of Scott's Early Life*, 1937; Una Pope-Hennessy, *Sir Walter Scott*, 1949; and D. Grant (editor), *Private Letters of the Seventeenth Century*, 1948 (a series of fictitious letters written and pub. anonymously by S.). See also NOVEL (SCOTT-ENGLISH FICTION OF THE NINETEENTH CENTURY).

Scott, William Bell (1811-90), Scottish painter and poet, b. at Edinburgh. His paintings include a series depicting Northumbrian hist. and the battle of Chevy Chase, at Wallington Hall. Ho pub. verse, lectures on art, and an autobiography (1892).

Scott Case, The Dred, see DRED.

Scottish Borderers, see KING'S OWN SCOTTISH BORDERERS.

Scottish Council, The. The S. C. is directly representative of the Scottish local authorities, the Scottish chambers of commerce, the trades unions in Scotland, and the Scottish banks. Membership is also open to trade associations, firms, co-operative societies, trade councils, corporate bodies of all kinds, and private individuals. The S. C. is strictly non-political. It co-operates with gov. depts., with its own highly important constituent bodies, and with other agencies in promoting the well-being of Scotland, but while it is co-operative it is also completely independent. It is financed by Scottish voluntary sources. The primary aims of the council are the development of existing industry; the growth of new industry in Scotland, and the attraction where necessary of suitable new industry from outside; the development of the economic utilisation of Scottish natural resources; ensuring that Scotland receives a fair share of all gov. provision; the promotion of Scottish export trade; and publicity for Scotland, and what it can do. The council's activities are controlled by its executive committee, which is advised by a number of standing committees. To assist in the general work of the council, and particularly to increase Scottish overseas trade, standing committees are maintained in London, New York, and Canada. The council's offices provide a free service of information, advice, and assistance, both within Scotland and outside.

Scottish Gaelic, see GAELIC LANGUAGE AND LITERATURE.

Scottish Language and Literature, see under SCOTLAND.

Scottish National Library, see ADVOCATES' LIBRARY.

Scottish Philosophy, system of, or rather a tendency in, philosophy expounded by a series of Scotsmen. Though attempts have been made to find indications of its principles in earlier writings, it may be considered as having been inaugurated by Reid in 1764 with his *Inquiry into the Human Mind on the Principles of Common Sense*. It is from this book that the school derives its somewhat misleading title of the 'Common-sense School.' Reid wrote in opposition to David Hume, whose empirical method and sceptical analysis of knowledge he attempted to undermine by his insistence on the fact that the mind naturally recognises certain fundamental truths or principles of judgment, and that these are an integral part of experience. It thus shows some kinship with Kant's teaching on categories. Reid's views were taken up and elaborated with considerable skill by Dugald Stewart, but were modified to an extent which virtually changed their nature by Dr. Thomas Brown, Sir Wm. Hamilton, the last of the Scottish philosophers, deals with the subject in the light of Kant's contributions to philosophy. See J. McCosh, *Scottish Philosophy from Hutcheson to Hamilton*, 1871, and A. Pringle-Pattison, *Scottish Philosophy*, 1885.

Scottish Regiments of the Brit. Army. Both Scotland and Switzerland during their early hist. counted among their prin. occupations military service in the pay of foreign govts. The causes in both countries alike were poverty of national resources, lack of opportunity for young men of spirit at home, pop. pressure and 'land hunger,' and the capacity to march and fight on meagre rations. In the case of Scotland were added a numerous and poverty-stricken gentry accustomed to despise bourgeois professions, and valuable experience gained in civil wars more frequent and more bitter than those of England. These conditions applied alike to the Lowland and Highland areas, and down to the union of 1603 Scottish soldiers were frequently in the pay of France, the Low Countries, Sweden, and Russia, but rarely in that of England.

The first Stuart sovereign of Great Britain did not add substantially to the Scottish element of his armed forces, but his son and successor raised the Royal Scots and the Scots Guards, while Charles II. raised the Royal Scots Fusiliers and the Scots Greys. The King's Own Scottish Borderers and the Cameronians came into being under William III. The first Highland regiment as such was the Black Watch, formed in the reign of George I. from independent companies of military police or *gendarmerie* which had been in existence since the time of the Covenanters (q.v.).

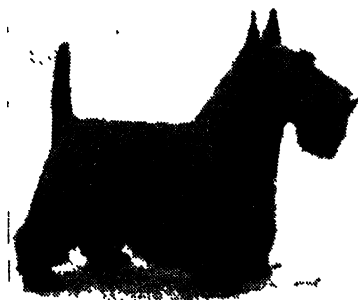
S. R. at present in existence (beside the above-mentioned) are as follows: *Highlanders*: Highland Light Infantry; Seaforth; Gordons; Queen's Own Cameron; Argyll and Sutherland. *Yeomanry*: Ayrshire; Lanarkshire; Lothians and Border Horse; Queen's Own Royal Glasgow; Kife and Forfar; Lovat Scouts; Scottish Horse. There are in addition the following

territorial units raised, in theory at least, from expatriate Scots in England: London Scottish; Liverpool Scottish; Tyneside Scottish.

In Canada, Australia, New Zealand, and S. Africa there are numerous regiments bearing Scottish titles and wearing uniforms of a distinctively Scottish type all affiliated to S. R. on the United Kingdom estab. It is noticeable that such affiliations are preponderantly to Highland regiments, though as will be seen above these as a group are junior to the Lowland regiment.

Outside the United Kingdom the typical Scottish soldier is conceived as a Highlander, and this reflects the enormous prestige won by the almost entirely Highland army of the Young Pretender, whose small force came near to conquering not only the Lowlands, but the whole of England. Such was the alarm raised by the very thought of Highland soldiery that after 'the '45' the wearing of Highland dress and the playing of pipes were criminal offences in the Brit. Isles, and it was not until twenty-one years after the event that the elder Pitt had the courage to exploit this reserve of man-power as a military resource. Between 1766 and 1800 eleven new Highland battalions were raised. The fact that more were not raised after that period is due to the decline of pop. of the Highlands which had already set in, and has now so far progressed that at present only a very small proportion of recruits to Highland regiments are actually natives of the region. See Sir Walter Scott, *Old Mortality*, 1816, and J. B. Kirkwood, *The Regiments of Scotland*, 1949.

Scottish Rifles (The Cameronians), see CAMERONIANS.



SCOTTISH TERRIER

F. Fall

Scottish, or Aberdeen, Terrier, very popular dog with great intelligence and pluck, and a keen sporting animal. The head is long, slightly domed, and covered with short, hard hair; the muzzle is powerful, tapering towards the nose. The eyes are dark brown; the prick ears small; neck short, and strongly set on sloping

shoulders; the body somewhat long; the legs short, the forelegs straight, and well set on under the body; tail carried high with a slight bend and never docked; and coat about 2 in. in length, hard, wiry, and dense. The colour is steel grey, brindle, and black.

Scotus, see DUNS SCOTUS and SCHOLASTICISM.

Scouts, Boy, see BOY SCOUTS.

Seranton, fourth city of Pennsylvania, U.S.A., and co. seat of Lackawanna co., on the Lackawanna R., 144 m. from New York. It is the centre of the anthracite coal trade, having mines beneath the city, and an important railway junction. It manufs. silk, cotton and woollen goods, lace, buttons, and all kinds of machinery. It is a fine city, well built and lighted. S. was incorporated as a bor. in 1854. It has so many people of Welsh origin that when Lloyd George visited it, he said it seemed as if he were at home. Pop. 140,400.

Scraper Board Drawing, see under SCRAFFITO.

'Scrap of Paper,' see QUINTUPLE TREASY.

Scratch-coco, see COCCO.

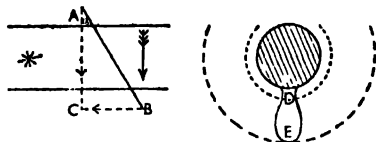
Screen, in architecture, a partition dividing off some portion of an interior or room from the rest of its plan without shutting up the space overhead. In the Gothic style, ss. are exceedingly beautiful internal features, and are used for a variety of purposes both in civil and eccles. architecture. Sometimes they are solid, sometimes of openwork, of stone, or of timber.

Screen, Half-tone (printing), see under PROCESS WORK.

Screw Pine, name given to members of the genus *Pandanus* characterised by the prickly strap-shaped leaves being arranged spirally and forming tufts or crowns somewhat like those of the pineapple. Some of the smaller species are handsome pot plants.

Screw-propeller. If a screw, fitting into the thread of a nut, be filed smooth except for one thread turn, and then revolved, it will move forward or backward; if, however, the screw be so held as to be prevented from moving forward or backward, but yet allowed to rotate, and the nut prevented from rotating but free to move forward or backward, the rotation of the screw with its one thread turn will move the nut. The single thread may be filed away, except for a few pieces as flanges, and the same action follows. The screw-propeller is practically such a revolving shaft, with two or more flange blades at the end so arranged that they exert a pressure on the water and thus, since action and reaction are equal and opposite, the water pushes the shaft forward. The blades cut their thread in the water, but as that is yielding, there is a combined push and slip. In other words, one rotation of the shaft does not carry it forward one thread. The plan on p. 508 shows a rectangular plate, AB, fixed at angle α on a revolving shaft; if the movement of AB be in the direction of the arrow, the proportionate thrusts are represented by AC and BC; the movement of the shaft, neglecting slip, would

be opposite to the arrow BC, and its magnitude is $BC = AC \tan \alpha$. In a complete revolution $AC = \pi d$, so that pitch and consequently thrust $= \pi d \tan \alpha$. Reference to the end section, where D is a point near the shaft and E the end of the blade, shows that the circumference πd is much smaller for D than for E, the thrust being much less therefore. The varying thrusts throughout the blade are equalised by increasing the pitch angle α nearer the shaft. Owing to the variation



of angle, it is usual to speak of the pitch angle as that found at two-thirds the diameter of the propeller. It is obvious that without variation of pitch angle the propeller at D would be pulled through the water, creating a contrary thrust and with a tendency to cause an extra pull on the water. The following up of the water may balance the tendency to slip or even create a negative slip, but this and other complicated irregularities may lead, particularly at high speeds and with carefully designed propellers, to a pull on the column of water greater than it will respond to, and the phenomenon of cavitation occurs. This leads to sudden and much increased slip, and occurs well before the drag equals atmospheric pressure. The two-thirds diameter pitch angle is taken at the point of greatest efficiency of the propeller, and the most efficient angle is theoretically 48° . A pitch of 40° is, however, only realised in practice with very slow-speed engines. The modern high-speed motors in motor boats have a fine pitch. It is usual to calculate slip from the hull design and the engine, and to fit the most efficient pitch-angle propeller to it. Mackron's formula is $P = 737 \sqrt{I.H.P./R^3 D^3}$, when P = the pitch in feet, R = r.p.m., D = diameter of propeller in feet. Blade area is, of course, another variable factor, and its ratio to the disk area, i.e. the circle described by the tip of the blade, is from one-third to two-thirds. In theory 77 per cent of maximum efficiency can be reached; in practice, 55 per cent is usual. The propeller is more efficient by virtue of its position than paddle wheels, and is liable to much less damage. Twin screws are common, and are used for steering, while in case of breakdown of the one the other can be kept in action. Reversible propellers are designed for fast motor boats, the pitch of the blades being reversed by suitable mechanism in the hub. The introduction of the turbine engine permitted the use of more than two propellers, and the rapidity of rotations has led to smaller diameter and increased blade area.

Manganese bronze is the metal in general use; it is finely polished and has sharp edges. The thrust sides of the blades are

usually flat, but are sometimes slightly curved; the outside is curved and the thickness varied as necessitated by strain. The needs of aviation have led to much further work in aerial propellers. They are made of wood, aluminium, or steel, and in most cases are two-bladed. See also AERONAUTICS. See F. H. Todd, *Screw Propeller Experiments*, 1934; A. Funge-Smith, *Introduction to Marine Engineering*, 1945; F. Mewcock, *The Elements of Aircraft Propeller Design*, 1947; and T. Theodorsen, *Theory of Propellers*, 1918.

Screws, Bolts, and Nuts. The origin of the wood screw cannot be attributed to any one. The screw principle, however, is thought to have been known as early as 300-200 B.C., coupled with the name of Archimedes (287-212 B.C.). Throughout the industrial revolution, wood screws were made in ever-increasing quantities, until to-day millions are made daily; for instance, in 1800 it is reported that 98,800 gross were made, and again, in 1819, 3,610,000 gross were made, thus showing the gradual increase in production. The wood screw as it is known to-day, i.e. with a gimlet point, this point enabling small screws to be driven into soft wood without a pre-drilled hole, and in the case of larger screws to facilitate the driving, was first commercially made in Great Britain by Nettleton in 1854, the works being built in Birmingham for this purpose to accommodate Amer. machinery, the basic working principle of which was to form gimlet points. These common products are made from wire, the wire being first cut to length in a heading or cold forging machine, in which machine the head is formed by forging. This operation is followed by turning and slotting the head; finally the thread is cut by a single-point cutter on automatic lathes designed for the purpose, the other two machines also being fully automatic.

Bolts.—The origin of the bolt (and nut) likewise cannot be attributed to any individual; however, uniformity of design or standardisation can very definitely be attributed to Sir Joseph Whitworth, whose standards were adopted in 1811. Bolts to-day are manufactured by either hot or cold forging—in either case, two forging operations are needed. Following these, a trimming operation is carried out to shape the head of the bolt, this either being hexagonal or square. The threads of the bolt are either cut or rolled. In the case of a cut-thread bolt, the threads are not cut as are the threads of wood screws, but by four cutting tools, known as chasers, mounted in one holder; this holder rotates on to the bolt, or vice versa. In the case of rolled threads, the bolt shank part, to have the threads impressed on it, is slightly reduced, so that when the threads are rolled the full diameter is equal to that of the plain shank. In rolling the threads on a bolt, no metal is removed, this rolling operation being to roll the shank of the bolt between flat reciprocating dies, the two contacting faces of the dies having the negative form

of the threads. These impress on the bolt shank these forms, just as a pencil might be impressed if rolled between the palms of the hands.

Nuts are made in a variety of ways the most up-to-date method being by cold forging, the operation being performed on a progressive header. This transfers automatically the piece being forged from one die to the next, each operation furthering the final shape of the nut; the raw material for this machine is round wire in coil form. Other methods of nut manufacture are by hot forging, turning from the bar, and by pressing. All these four methods of manufacture mentioned do not incorporate a thread, tapping the thread being a subsequent operation.

Unified Screw Threads.—To simplify the exchange of screw thread assemblies, such as machinery, cars, etc., the Unified Screw Thread System has been agreed upon by the United Kingdom, U.S.A., and Canada. There are three standards: the unified coarse thread series (U.N.C.), the unified fine thread series (U.N.F.), and the unified special thread series (U.N.S.). The basic form of unified thread has an angle of 60°, the bolt or male thread having rounded roots and crests, whereas the nut or female thread has a rounded root and a flat crest.

Scriabin, Alexander (1871-1915), Russian composer, *b.* in Moscow. Like Wagner, S. had a unified idea of art, behind which was a religious mysticism, but in his musical development he was strongly individual. Among his works are three symphonies, two tone-poems (*L'Etiase* and *Prometheus*), numerous pianoforte sonatas, preludes, *Cludes*, valses, etc. In *Prometheus* he attempted to synthesise music and colour by means of a 'colour-keyboard,' but without success; he developed, too, an individual harmonic basis which had a symbolic musical significance with him, comparable with the mysticism of the theosophists; the device, demanding special study, failed to attract the general concert-going public. His work has had a profound influence on Russian music. See A. Eaglefield-Hull, *Scriabin, a Russian Tone-Poet*, 1916, and life by A. Swan, 1923.

Scribe, Augustin Eugène (1791-1861), Fr. dramatist, *b.* in Paris, first attracted public attention by his *Nuit de la garde nationale* (1815), when Delcroix-Poirson was his collaborator. It is true that he was himself a man of remarkable energy and fecundity of invention, but a dramatic workshop, where disciples worked under his supervision, alone accounts for the astonishing rapidity with which he manufactured plays. A rare faculty for the construction of ingenious plots, a thorough appreciation of stage technique, and a complete understanding of the *bourgeoisie* account for the success of his *L'Ours et le Pacha* (1825); *Bertrand et Raton* (1833); *Le Verre d'eau* (1842) and *Adrienne Lecouvreur* (1849), as well as of his libretti to the operas, *Robert le Diable*, *Les Huguenots*, *La Juive*, and *Haydée*, etc. See N. C. Arvin, *Eugène Scribe and the French Theatre, 1816-60*, 1924.

Scribe (Heb. *sopher*), biblical word indicating a secretary or writer. Thus Seraiah is called the S. or secretary of David (2 Sam. viii. 17, xx. 25, etc.), and Shebna was secretary to Hezekiah (2 Kings xviii. 18, 37). Among the post-exilic Jews it was the peculiar office of the S. to study the book of the law, to read and explain it to the congregation, to transcribe it and multiply copies of it among the nation at large. The word S. therefore signified one learned in the scriptures (Ezra vii. 6, 11). The S. by profession were usually priests or Levites, and carried with them, as oriental S. do at this day, the implements of their art. The N.T. speaks continuously of the S. and the Pharisees as a single group, because in later times the S. were nothing more than the 'theologians' of the Pharisaic sect.

Scribner's Sons, Inc., Charles, New York, publishing firm founded by Charles Scribner (1821-71). Descended from a Connecticut scrivener, Charles Scribner was educated at Princeton College, and travelled in Europe. In 1845, owing to ill health, he abandoned the law and turned to publishing. In 1846 he founded the firm of Baker & Scribner with Isaac D. Baker as his first partner. In 1850 Baker & Scribner became Charles Scribner & Company. After the founder's death in 1871 his son Blair first reconstructed the firm into Scribner, Armstrong & Company. In 1878 the firm received its permanent title and Blair was joined by his brothers Charles and Arthur. Charles Scribner started *Scribner's Magazine* in 1886. Both his son and grandson followed him into the firm. Among the many well-known authors on their list are Ernest Hemingway, Scott Fitzgerald, Henry James, J. Galsworthy, and H. G. Wells.

Scrip (abbreviation for 'subscription'), provisional document entitling the holder to a share or shares in a joint stock company, and exchangeable for a formal certificate when the necessary payments or subscriptions have been completed. Hence loosely, share certificates in general, or certificate of stock subscribed to a bank or other company, or of a subscription to a loan. The suggestion that S. is the same word as 'script' has been superseded by the above etymology.

Scriveners' Company. One of the smallest of the London livery companies, granted a livery by Edward III. in 1357 and incorporated in 1617. The court of aldermen in the reign of Henry VIII. placed the company forty-fourth in precedence, between the Woolmen and the Fruiterers.

Scrobbybyrig, see SHREWSBURY.

Scrobbybyrigscolr, see SHROPSHIRE.

Scrofula, or **Struma**, terms formerly applied to a condition marked by enlargement of the lymphatic glands and general malnutrition. It is now known to be a tuberculous affection. See TUBERCULOSIS; KING'S EVIL.

Scroll-cutting, see PATTERNWORK.

Scrolls, Dead Sea, see under SCROLLS OF THE LAW.

Scrolls of the Law, rolls of parchment containing the Torah or Five Books of Moses and used by the Jews during their synagogue services. Indeed, the *Qeriath ha-Torah*, or 'Reading of the Torah,' is the central feature of the synagogue service. Every synagogue must contain at least one copy of the S. of the L. The scrolls must be placed in a separate ark, before which burns a perpetual light. The position of this ark is in the direction of Jerusalem. The practice is to read the law from Genesis to Deuteronomy once every year. It is divided into fifty-four weekly sections (the length of the Jewish year varying by the addition of a whole month in leap years) and the reading takes place on the sabbaths, the festivals, and the fast days. The preparation of the scroll is a task requiring much care, erudition, and labour. It must be written by hand, with black, indelible ink, by accredited, professional scribes (Heb. *sopher*), on sheets of parchment, especially prepared for the purpose, made from skins of animals permitted for food (Lev. xi. 1-9; Deut. xiv. 3-9). The scrolls are prepared in the form of long rolls (sometimes 12-14 in. wide), and fastened at each end to wooden rods, so that they can be rolled from one end to the other. The strictest accuracy is necessary, no scrolls which have been found to be at fault even in the most minute detail being considered fit for religious service. The scrolls contain only the consonantal text; it is unpointed and unpunctuated; no decorations or illuminations are permitted; even such matters as divs. into paragraphs and sections, and the special size of certain letters (some are particularly large, others particularly small) are strictly determined.

Dead Sea Scrolls.—Until recently the earliest Heb. MS. known of any part of the Bible was a copy of the Pentateuch in the Brit. Museum, attributed to the ninth century A.D., at Leningrad there is a copy of the prophets which bears the date of A.D. 916, and at Oxford a copy of nearly the whole Heb. Bible which is attributed to the tenth century. There are a few other MSS. which bear dates as early as, or earlier than these (the so-called Ben-Asher codex of the synagogue of the Karaites in Cairo, dated A.D. 895), but these dates are generally believed to be unreliable. Most archaeologists were rather sceptical of finding copies of ant. scrolls in Palestine, because in its damp soil (unlike the dry soil of Egypt) no papyrus or parchment could be expected to endure to our time. Biblical scholars had thus to accept the fact that there was a gap of more than a thousand years between the earliest Heb. MSS. extant and the latest of the books contained in it. There was only one papyrus MS. to bridge this gap, the Nash papyrus, found in Egypt some fifty years ago, and now in the Univ. library of Cambridge. It consists of a narrow strip of twenty-four lines, containing the Ten Commandments in the version from Exodus and some verses from Deuteronomy. At first it was variously dated in the second or first century B.C., but since 1937 evidence has

been brought by Prof. W. F. Albright for dating it c. 100 B.C.

An epoch-making discovery was made in the summer of 1917. Like very many discoveries it was made by chance; a wandering goat led its goatherd to a cave in which was found a rich hoard of biblical and other Heb. (also one Aramaic) scrolls or fragments of scrolls. This cave is situated in a most remote and inaccessible spot, some 8 km. S. of what was once the Kallia Hotel along the track to 'Ain Feshkha, about 1½ m. from the shore of the Dead Sea, and about ½ m. N. of Kh. Qumran. It is not known yet how many scrolls were actually found. Those which have so far come to the knowledge of the W. world have been acquired by the Heb. univ. of Jerusalem and by the Syrian Orthodox convent of St. Mark in Jerusalem, the latter body having temporarily handed over their MSS. for pub. to the Amer. Schools of Oriental Research. The following group of scrolls belong to this latter group: a nearly complete text of the book of Isaiah; a kind of commentary on the first two chapters of the book of Habakkuk; two other hitherto unknown books, the 'Sectarian Document' and apparently a 'Book of Lamech.' Material in the hands of the Heb. univ. consists of two hitherto unknown books, *The War of the Children of Light against the Children of Darkness* (this title, given by Prof. Sukemik, was drawn from the first line of the first page of the MS.) and *Hodayoth*, or *Thanksgiving Hymns*, and about one-third of another copy of Isaiah.

In Feb. and March 1949 the cave was examined by Mr. G. Lankaster Harding (chief curator of antiquities of the Hashimite kingdom of Jordan) and by Père de Vaux (a leading biblical archaeologist). Although no complete rolls or even very large fragments were recovered, their excavation is important in that they place beyond all possible doubt the authenticity of the hoard; many fragments of pottery were recovered, and it seems that originally there have been some forty jars and as many bowls, which latter were presumably inverted over the necks of the jars to close them. It is thus beyond doubt that the preserved scrolls were kept in closed jars (see Jer. xxxii. 14). Two complete jars had been previously acquired by the Heb. univ. According to the archaeologists who examined the pottery this is certainly pre-Roman, and most probably of the second century B.C. Apart from the fragments of pottery there were also recovered some hundreds of fragments of MSS. varying in size from a few mm. square to a third of a roll. These include fragments of Genesis, Deuteronomy, Judges, Daniel, and others. Most remarkable are five small fragments of Leviticus (parts from chaps. xlv.-xxli.), written not in the Heb. square character, as all the other material, but in the early Heb. script (see under ALPHABET), and it seems that they represent a beautiful book-hand, the first of its kind ever discovered, which might have been the literary hand of the kings and prophets of ant. Israel. Problems connected with

the dating of these scrolls are numerous, and they will inevitably occupy scholars for a long time. However, archeological, palaeographic, and internal evidence carry considerable weight in favour of about the second century B.C., but it must be pointed out that there is no consensus of opinion even among the scholars who not only accept the authenticity of the find but also its early date.

Scrophularia (order Scrophulariaceae), perennial herbs with brown flowers. Tribes: Salpiglossideae, Antirrhinideae, and Rhinanthideae. See FLOWERS.

Soudéry, Madeleine de (1607-1701), Fr. novelist, b. at Le Havre, was a sister of Georges de S., Fr. dramatist (1600-67). The extraordinary vogue she enjoyed as a woman of letters is accounted for by the vicious contemporary taste. Her interminable romances, *Artamène, ou le Grand Cyrus* (10 vols., 1618-53); *Clélie* (1654-1660); and *Almahide* (8 vols., 1661-63), are spun out with worthy moralisings and prolix conversations not deficient in wit. They are all variations on the same theme of love, abductions, described with the utmost propriety, being introduced to flavour the monotony. Her originality lies in having done openly and knowingly what her predecessors, La Calprenède and Marin de Gomberville (q.v.), had done unconsciously. Her novels, especially *Clélie*, may be said to foreshadow the psychological novel in Fr. literature.

Scudo, It. silver coin, worth about four shillings. It was called a *scudo*, or shield, because an heraldic scutcheon was stamped on its face.

Scullin, James Henry (b. 1876), Australian statesman b. in Australia of Irish parents, educated at Mount Rowan School near Ballarat; joined the Labour party in 1903. Elected to the Federal Parliament in 1910 as member for Corangamite (Victoria), he lost his seat at the next election (1913). He ed. an evening paper pub. at Ballarat. Re-elected to the Federal House of Representatives, 1922, as member for the Yarra div. of Melbourne, he was leader of the Federal Parl. Labour party from 1928 to 1935, and from 1929 to 1931 was Prime Minister and minister of industry. It was during his tenure of office that the first Australian politician, Sir Isaac Alfred Isaacs, was appointed governor-general of the Commonwealth of Australia, the king being advised thereon by his Australian ministers.

Sculling, art of propelling a boat through the water by means of a pair of sculls, which have more concave blades and shorter looms (the distance between the rowlock and the handle) than the normal racing oar. When bridges were few and roads hazardous the waterman who could ply a lively pair of sculls was much in demand. It came about, therefore, that between them there was a fierce rivalry as to who could propel a boat faster than another. Wagers were laid and prizes offered, and S. was born into a professional element. A comedian by the name of Thomas Doggett (q.v.) founded in 1715 the race for Doggett's Coat and Badge. This race, the oldest ann. sporting event

in the world, survives to this day. From this it followed that the world's S. championship, together with many lesser races, brought until recent years monetary rewards well worth the winning. Amateur S. did not establish a permanent place in our racing calendar until the founding of the diamond sculls at Henley regatta in 1814. Next in importance in this country is the Wingfield sculls (confined to amateur scullers of Great Britain), which is sculled for annually between Putney and Mortlake. Every regatta to-day has its S. race, and in recent years Henley regatta, recognising the popularity of double S., has added it to their racing schedule.

Sculptor's Tool, see CÆLUM SCALPTORIÆ.

Sculpture may be defined briefly as the art of representing living creatures or objects in inanimate nature, either by modelling them in a pliable substance or by hewing them out of a hard material. A piece of S., however, is not necessarily an independent bust or statue, wherein the artist shows the entire circumference of his subject; for the term is also applied to what is otherwise known as bas-relief, this consisting of modelled or carved work projecting from a flat surface, usually the wall of a building (for bas-relief see more particularly STONE CARVING). In general the sculptor first models his theme in clay or plaster, and afterwards reproduces this by casting it in bronze; or, should he desire to have his production perpetuated in stone, he brings to his aid a mechanical instrument called a pointing machine. But few sculptors attempt to handle this contrivance themselves, or undertake casting in bronze; as a rule, work of these kinds is done by an assistant craftsman. There has, however, been a return by twentieth-century sculptors to the direct method of carving in stone. Stones that are most used for S. are Parian marble, Pentelic marble, Carrara marble, Georgia marble (the marble of America), oolitic limestone, Eng. Hoptonwood stone, Purbeck marble, grey and yellow sandstone, granite, and basalt. Stone S. both in ant. and modern times is occasionally tinted. Terracotta, baked red or yellow, is another favourite sculptor's medium, while wood that is used for carving is, for small objects, boxwood, and for larger works, walnut, ebony, oak, elm, and some hard tropical woods. There are various methods of bronze casting, but the *cire perdue* (q.v.) method of modelling the wax is the best. Bronze is best patinated by exposure, but artificial finishes are now sometimes used. Silver, ivory, and jewels may be sparingly employed in connection with bronze S., and ivory may be used alone. Such metals as highly polished brass are now being used for casting.

Crude forms of carving have been practised from time immemorial by savage races, but the earliest S. which really belongs to the category of art is that of the Egyptians, whose greatest achievement therein, the Sphinx, was done fully 1000 years B.C. For hundreds of years thereafter the Egyptians produced much statuary, most of it in limestone or granite.

Another early school of note is the Assyrian, and about 500 B.C. Greece produced an extraordinary galaxy of workers in stone and metal, notably Myron, Polykletus, Praxiteles, and the mighty Phidias, known chiefly by his decoration of the Parthenon. An equally famous Gk. work of this period is the huge Venus now in the Louvre, the name of whose artist is unrecorded. While the greatest Hellenic masters were making colossal works of this kind a minor band were engaged on the small but exquisite statues in terracotta, nowadays called Tanagras, a name derived from the vil. of Tanagra in Boeotia, where the art in question was mainly wrought. Eventually Hellas was subjugated by the Romans, and thenceforth the Gk. artists devoted their skill mostly to the service of their new rulers; the latter likewise practised S. themselves, and much of their output reflects not only Hellenic but Egyptian influence. S. is supposed to have begun in India before Christ, and in China about A.D. 130, while some 600 years later it commenced in Japan, where it attained high artistic standards for at least ten centuries afterwards. The Jap. sculptors were largely concerned with decorating Buddhist temples, and while they were thus employed a kindred form of activity arose in Central America, the Indians there making beautiful statues of their gods, and using S. to embellish huge pyramids, in particular that of Xochicalco in Mexico, which is still standing, though in a somewhat dilapidated condition. It is commonly thought that art of this sort began in America towards the end of the thirteenth century. The native S. of Africa has yielded an immense variety of stylised but very vigorous and expressive, carving in wood and stone, as well as bronze work, which was to have a decisive influence on the development of W. European art.

Europe fostered a very notable group of sculptors: the It. of the Renaissance. In Italy, during the twelfth century, various differences had arisen between the papal and imperial powers, and this had proved a great stimulus to architecture, the clergy seeking to augment their influence by building more churches, while at the same time there had been a marked blossoming of æsthetic taste among some of the noble families, for instance the Medici. A demand for S. was thus evoked and, accordingly, when the Pisan sculptor Nicola started work about 1230 he found his country ripe for the reception of his talents. He was followed in the fourteenth century by Brunelleschi and Ghiberti, who were succeeded by Donatello and Luca della Robbia, both of whom excelled in carving groups of choristers, while the year 1475 witnessed the advent of the greatest of all It. sculptors, Michelangelo, and a little later came his ardent disciple, Cellini. After the death of the last-named pair of artists S. waned in Italy, and the finest works by Bernini in the seventeenth century, and by Canova in the eighteenth, are distinctly inferior to the output of the Renaissance (see ITALIAN ART).

S. had been practised in France since pre-Christian times, and had reached no mean eminence there in the Middle Ages, especially in the S. on Chartres cathedral, and also in the Renaissance in the decorative work of the Fr. Jean Goujon (q.v.), but it was the influence of Michelangelo and his school, eagerly imbibed during the sixteenth and seventeenth centuries by the Fr., that laid the foundation of their lofty school of statuary. Fr. S. was encouraged by Louis XIV., who commissioned many busts for his palace of Versailles, and France has since that time remained the premier land in S. In the reign of Louis XV. she produced charming and graceful artists like Guillaume, Coustou, Falconet, and Clodin; during Napoleonic days powerful work was done by Houdon and Chinard, and near the close of the nineteenth century a constellation of masters arose in France prominent among them being Bartholomée, Dalou, and Auguste Rodin (1810-1917), one of the most celebrated sculptors of modern times. The influence of the Renaissance also penetrated to Spain, being carried thither by Berniguel, a sculptor who had studied under Michelangelo, while some exquisite work in marble was done in the seventeenth century by another Spaniard, Alonso Cano. In England, however, the Renaissance had little immediate effect, and, apart from the carvings on stone executed early in the Christian era by Celtic craftsmen, there was little good S. in Britain prior to the time of Flaxman, b. in 1755. Since his day, however, statuary and bas-relief have been widely produced and memorable work has been done by Stoll, Stevens, and Leighton, Watts, Frampton, and Macgillivray. In other countries, Denmark produced a great sculptor in the eighteenth century, Thorwaldsen; and fine work was achieved later in Russia by Trubetzkoi.

Modern Sculpture.—The First World War resulted in a large demand for sculptured war memorials, but the taste of selection committees ensured a low standard of achievement. Sweden alone of modern states has taken an official interest in S. in relation to architecture, using it on the many fine public buildings at Stockholm. Carl Milles is a sculptor of great distinction. In Norway Gustaf Vigeland (q.v.) was one of the outstanding sculptors of the late nineteenth and early twentieth centuries. In France there are two currents of influence in modern S. Antoine Bourdelle (1861-1921) was the direct successor of Rodin, while the so-called traditional school was represented by Ernest Dubois, Victor Segoffin, and Aristide Maillol. Two main schools have predominated in England, the decorative school of Alfred Gilbert and the naturalistic school of Derwent Wood. Prominent among the independent artists are Jacob Epstein and Eric Gill (1882-1940). The Yugoslav Meštrović has been responsible for the great monument of the Racias at Cayta, the Canadian war memorial, and a magnificent 'Deposition.' The greatest of Czechoslovak sculptors is Joseph Wenceslas Myslbek. The Russian

A. Archipenko is one of the greatest exponents of cubism in S. Outstanding among Amer. sculptors were A. Saint-Gaudens (*q.v.*) and Daniel Chester French (1850-1931).

Contemporary Sculpture.—The impetus given by Rodin to a tradition of vigorous naturalistic S. based on the intensive study of the living model, has continued to inspire sculptors in most countries up to the present day. Recent representatives of this school have been Charles Despiau and Gaston Luchaise in France, Georg Kolbe and Ernesto di Fiori in Germany, Hermann Haller in Switzerland, Siegfried Charoux and Georg Ehrlich in Austria and, in his bronze work, Jacob Epstein in England. Alongside of this tradition the search for new values and new means of expression in S. has brought forth a wealth of work in a profusion of styles including the super-realist. By far the most decisive influence has been that of primitive art: Negro, archaic Gk., early Mexican, Etruscan, and early medieval S. Some of the works by Amadeo Modigliani, Jacob Epstein, Leon Underwood, and Henry Moore are striking examples of this influence.

Pioneers of abstract and near-abstract S. are Constantin Brancusi (*b.* 1876) and Ossip Zadkine (*b.* 1890). Brancusi especially is concerned in his work with the beauty of abstract shape, from which he eliminates, in most cases, any representational elements. Zadkine's work is as a rule based on the human figure and often combines a variety of abstract and decorative elements. Followers of the non-representational school who have developed experimental S. even further are Henri Laurens, Jacques Lipchitz, Jean Arp, A. Giacometti, Naum Gabo, Antoine Pevsner, Duchamp-Villon, Barbara Hepworth, and Arthur Calder. They have frequently employed glass, metal, string, and wire combined with other sculptural materials in their 'constructivist' work.

Among less extreme sculptors who have steered clear of purely abstract influences, but whose work is powerfully expressive of the modern idiom, are Marino Marini in Italy, Gerhard Marcks in Germany, and Frank Dobson in England. J. de Creeft is a distinguished American sculptor, working in an independent style. Henry Moore (*b.* 1898) (*q.v.*) is generally regarded as the most outstanding of present-day sculptors. Out of varying influences he has evolved a style which is one of the most individual in modern art, equalled only by that of Picasso and Matisse. His most famous works are the Northampton Madonna, 'Three Standing Figures,' and his Family Group. They combine abstract values with an intensely humanistic power.

See also MODELLING; ROCK SCULPTURE.

See G. Vasari, *Lives of the Most Eminent Painters, Sculptors, and Architects*, 1551 (new ed. 1912; Everyman's Library, 1927); C. Zervos, *L'Art en Grèce*, 1935; J. C. Martin and others, *Circle*, 1937; J. Epstein, *Let There Be Sculpture*, 1940; V. II. Valentino, *The Origins of Modern Sculpture*, 1946; J. C. Rich, *The Materials and Methods of Sculpture*, 1947; E. Newton,

British Sculpture, 1944-46, 1947; A. Dürst, *Wood Carving*, 1948; H. Read, *Henry Moore, Sculpture and Drawings*, 1949; and E. H. Ramsden, *Twentieth-Century Sculpture*, 1949.

Seunthorpe, tn. of Lincolnshire, England, 25 m. W. of Gt. Grimsby, with steel works and blast furnaces. Pop. 53,000.

Scurvy, or Scorbutus, disease which occurs among people who have been deprived of proper food, as fresh vegetables, for some time. The condition commences with general debility and an appearance of malnutrition. After some weeks the characteristic symptoms show themselves. The gums become pale and spongy, and the teeth may be loosened; there are extravasations of blood beneath the skin, giving an appearance of extensive bruises; bleeding takes place from the mucous membranes; the breath becomes fetid, and there may be visual disturbances. The disease proceeds to extreme exhaustion and a fatal ending, unless a remedy in the form of lime juice or fresh vegetables is at hand, when recovery takes place with marvellous rapidity. S. was at one time the scourge of armies, navies, exploring parties, and others who were deprived of proper food for a length of time. In 1795 lime juice was made part of the store of every Brit. war vessel, with the result that S. became unknown while the lime juice lasted.

The cause of the disease appears to be the absence from the food of some substance which is essential to health. This substance is now known to be vitamin C (ascorbic acid). It is present in extremely small quantities, which are, however, sufficient to maintain health, in such fruit as limes, oranges, tomatoes, and rose hips.

Seutage, see ESCORTAGE.

Scutari, or Uskudar (anc. Chrysopolis), tn. of Asia Minor on the Bosphorus, and a suburb of Constantinople. Behind the tn. is a large cemetery, the burial ground of the Eng. troops during the Crimean war. Silks, cottons, and leather are manufactured. Pop. about 83,000.

Scutari, or Skutari (Albanian Shkoder), tn. of Albania near the S.E. end of the lake of the same name, and connected with the Adriatic by the Bonaia R. It has a large trade in wool, tobacco, maize, and skins, and manufactures macaroni, alcohol, cigarettes, olive oil, etc. Adjacent is a height crowned by an old Venetian citadel. Pop. (prefecture) 132,300; (tn.) 30,000.

Scutari, or Skutari (Albanian Shkoder) Lake, on the borders of Albania and Montenegro, Yugoslavia, 10 m. from the Adriatic, is 30 m. long and 4 m. wide. Its W. coast is rocky, indented, and strewn with islets.

Scutum Sobieskii, Sobieski's shield, constellation in the S. hemisphere, N. of Sagittarius and S. of Serpens and Aquila, has no conspicuous star, but contains seven faint stars just visible to the naked eye.

Scylla, daughter of Nisus of Mitylene, a Gk. legend. She fell in love with Minos of Crete, and betrayed her father to him. Minos fastened her to the stern of his vessel to punish her treachery and dragged her along till she was drowned or changed

into the sea-bird Cirls (*Κείρις*). See Ovid, *Met.* viii. 6-151.

Scylla and Charybdis (*Σκυλλα, Χαιριβδης*), in Homeric legend, two dreadful sea monsters, who dwelt on two rocks between Italy and Sicily. On the rock nearest Italy, in a cave, lived S., daughter of Crataeus. She was represented as a six-headed monster, with twelve feet and the bark of a dog, and often with dogs' or wolves' heads springing from her body, who snatched and devoured sailors from the passing ships. On the lower rock, under a huge fig-tree, lurked Charybdis, who thrice a day swallowed down and thrice spouted out the waters of the sea, thus being known as 'the whirlpool.' See Ovid, *Met.* xiv. 52 ff.

Scyphozoa, see COELETERATA.

Seyros, see SKYRÉ, or SKYROS.

Scytale (*σκυτάλη*), staff of a peculiar shape, used by the ephori of Sparta for sending secret messages to officials or generals abroad. A narrow strip of leather was wound about the staff and written on crosswise. The message was then unwound, and the recipient deciphered it by wrapping it round a similar staff.

Seythia (Gk. *Σαυθία*) was, according to Herodotus IV., the region situated between the Danube and the Don, and inhabited by a warlike nomadic people known as Scythians or Scythians (Gk. *Σαυθιαί*; Lat. *Seythia*). It is now agreed that the anc. Sacæ of N.W. India spoke a Scythian dialect (the Persians called all Scythians 'Saka'), and as the 'Saka' language was Iranian, the Scythians must have been an Iranian group. Indeed, the Scytho-Parthian and Scytho-Persian affinity was already recognised in anc. times. It is possible that the Scythians were a mixed pop., but spoke Iranian.

Whatever their origin, in the seventh century B.C. the Scythians inhabited S. Russia, having invaded the country of the Cimmerians. During the reign of the Assyrian king Esarhaddon, the Scythians poured into Asia through the Caucasus region. Esarhaddon held them for the time being in check. On their swift-moving horses they penetrated as far as Philitia. This highest wave of the Scythian invasion, however, soon receded, although in Europe the Scythian culture expanded as far as Transylvania and Bulgaria. In the fifth and fourth centuries B.C., under the pressure of the Celts, Illyrians, and Macedonians in the W., and of the Sarmatæ in the E., the Scythians slowly receded, and in the late second century B.C. the last Scythian state (in Crimea) was destroyed. Much influenced by the civilisations of Greece and China, with whom they traded, the Scythians developed a simpler but distinctive art of their own, remains of which have been found in the numerous royal and other rich tombs of the sixth and fifth centuries B.C., discovered about the bend of the Dnieper, in the dist. of Kiev and Poltava, in the Crimea, etc.

Seythopolis, see BEIRAN.

Sea, term used to denote definite parts of an ocean, or certain large bodies of inland water, when salt. See also EARTH;

HYDROGRAPHY; OCEAN AND OCEANOGRAPHY; SEA WAVES AND SWELL; TIDES; and the articles on the separate seas.

Sea Anemone, see ANEMONE.

Sea Bass, see BASS.

Sea Bat, name given to the various species of *Platur*, a genus of Caramgidae related to the horse mackerels, on account of their long dorsal, anal, and ventral fins.

Sea Bear, see FUR SEAL.

Sea-blubber, see JELLY-FISH.

Sea Buckthorn, or Sallow Thorn (*Hippophae rhamnoides*), shrub growing on sandy shores, with spiny branches, silvery leaves, and small green flowers, followed by orange-yellow berries.

Seabury, Samuel (1729-96), first bishop of Connecticut, b. at Groton, Connecticut, took holy orders in England (1753), and at Aberdeen was consecrated by three bishops of the Scottish Episcopal Church. Through S. all Amer. bishops are linked with that church.

Sea Cadet Corps, youth organisation started by the Navy League in 1899 and first known as the Navy League Boys' Brigade. Its purpose is to train and assist boys who wish to enter either the R.N. or the Mercantile Marine. The corps is under the control of the Admiralty and the Navy League and both provide money for it, the Admiralty, however, providing the training equipment and training officers. Boys enter the corps normally at fourteen years of age, though there is a preparatory section for boys of twelve, and their training ends at eighteen. The admiral commanding the reserves is responsible for the training of the corps. Its strength in 1949 was 23,000 boys and 2000 officers. The headquarters of the S. C. C. are at 37 Gracechurch Street, London, E.C.

Sea Chart, see CHART.

Sea Cat, see CHIMERA.

Sea Cow, Northern, or *Rhytina Stelleri*, shenian once abundant in the N. Pacific, exterminated in 1768 by sailors on account of its value as food. It was about 25 ft. long, with a small head and hard, naked, bark-like epidermis. The fore-limbs were short and truncated, and the tail ended in a half-moon-shaped blade. The substitution of horny plates for teeth corresponds to the gum pads of the manatee. It fed on seaweeds.

Sea-cucumber, see HOLOTHURIAN.

Sea-eagle, see EAGLE.

Sea-elephant, see ELEPHANT-SEAL.

Seafarers' Education Service, which incorporates the College of the Sea, is a voluntary society founded in 1919 by Dr. Albert Mansbridge, C.H., and governed by representatives of shipowners', officers', and men's associations, by representatives of most of the voluntary societies connected with the sea and seamen, and by distinguished men and women interested in further education. The objects of the service include the provision of educational facilities for members of the Brit. Merchant Navy and fishing fleets, and the provision of libraries in ships and on shore for the use of seafarers. Up-to-date libraries are supplied to the crews of more than 1420 ships owned by 150 differ-

ent companies. Books supplied are representative of the best in all kinds of reading and are changed regularly. Libraries are installed at the order of shipowners, who pay for this service. Through the College of the Sea, and with the co-operation of 1200 voluntary tutors, the S. E. S. offers help and tutorial guidance in non-vocational subjects for study and hobbies of all kinds. Any Brit. seafarer, irrespective of whether his shipowner subscribes to the library service, may borrow non-fiction, exclusive of nautical text-books, on personal loan, receive tuition, enter for competitions, and take advantage of all other facilities available through the College of the Sea.

Sea Fisheries, see FISHERIES, SEA.

Seaford, popular seaside resort, 8 m. W. of Eastbourne, in Sussex, England, on the S. downs near the famous 'Seven Sisters.' Once an important port, until 1832 Seaford returned two members to Parliament. A new sea wall was completed after the Second World War. Pop. 10,200.

Seaforth: 1. With Waterloo, a suburb of Liverpool, from which it is 4 m. N.N.W., at the mouth of the Mersey, in Lancashire, England. It is a popular watering-place. Pop. 32,000. 2. Tn. of Huron co., 10 m. N.N.W. of London, Ontario, Canada. Pop. 2000. 3. A loch, 14 m. long, on the E. of Lewis, in the Hebrides, Scotland.

Seaforth Highlanders (Ross-shire Buffs, The Duke of Albany's), a famous Highland regiment, the two battalions of which are the 72nd and 78th Foot respectively. The 1st battalion had its origin in 'Fraser's Highlanders,' raised for service in the Seven Years War; the 2nd, in the 2nd Highland battalion also raised for service in that war. Both were disbanded at the end of the war, and soon re-formed: the 1st in 1778 by Kenneth, earl of Seaforth, and the 2nd in 1793 as the 78th Highlanders or the Ross-shire Buffs. When, on the army reorganisation of 1881, both were joined, the regiment received the name of the S. H., which was previously the designation of the 1st battalion. The regiment has its own special tartan, which is that of the Mackenzie clan, from whose members they were principally raised. Their service in the eighteenth century was largely rendered in India, and their battle honours, prior to the First World War, contain a number of the historic names in Anglo-Indian wars. The 1st battalion was in India when the First World War began, but was transferred to France in 1915 and thence to Mesopotamia, where it formed part of the Kut relief force. The 2nd was part of the original B.E.F. (*q.v.*), and fought at Mons, Le Cateau, the Marne, the Aisne, and at Ypres, and then in 1915 at Neuve-Chapelle, Festubert, where it sustained very severe losses, and Loos. This battalion also fought in the essentially Scottish victory of Beaumont-Hamel (*q.v.*), and was also conspicuous at Delville Wood, Martinpuich, and other engagements in the Somme battle of 1916. The 1st battalion was in Maude's triumphant march on Bagdad, and detachments took part in Allenby's great campaign. Meanwhile

the 2nd fought in the Ypres battle of 1917 and in the Somme and Lys battles of 1918. A Fr. memorial commemorates the part played by the S. H. with other Scottish regiments at Busancy where they fought in conjunction with Fr. troops. In the second World War a battalion fought in N.W. Europe with the First Canadian Army. Other battalions served in Italy and the Far E. In N. Africa and in Italy the S. H. formed part of the 51st (Highland) Div. under Maj.-Gen. Winberley. With the 7th Armoured Div. and the New Zealand Div. the 51st pursued Rommel to Tripoli, fighting at El Alamein, El Mareth, and Akarit, and later the same units played a conspicuous part in the conquest of Sicily (1943). In the battle of Normandy (1941) the S. H. were in the battles N. of Caen and E. of the Orne, and in much hard fighting in the Touffreville area, and again at St. Honorine-la-Chardonnerette and in the Bois de Bavent. Later in the campaign they served under the command of the First Canadian Army on the E. flank of the 21st Army Group. On the Rhine in February 1945 they took part with other Scottish troops in the fierce battles for coach and other defences of the Ger. W. wall. Companies of track-borne armoured troops of the S. H. also fought in Java (*q.v.*) during the Indonesian nationalist rising at the end of 1945. See Capt. F. W. Walker, *The Great Deeds of the Seaforth Highlanders*, 1915.

Sea-fox, see FOX-SHARK.

Sea-grapes, name for the clusters of large oval eggs of the cuttle-fish.

Seagull, see GULL.

Seaham, seaport and urb. dist., 6 m. S. of Sunderland, in Durham, England. Its harbour was constructed in 1823 by the marquess of Londonderry to facilitate the chipping of coal. The chief industry is coal-mining. Pop. 26,000.

Sea Hare, one of the six divs. of the Gastropoda (*q.v.*). It is a marine mollusc (genus *Aplysia*), and resembles the slug, which is also a Gastropod. The species *A. punctata* is to be found on the Brit. coast.

Sea-holly, see ERYNGIUM.

Sea-horse, see HIPPOCAMPRUS; WALRUS.

Sea Islands, group on which cotton and rice are grown, flanking the coast-lines of S. Carolina and Georgia, U.S.A., from Savannah to Charleston. They are low-lying and marshy.

Sea-kail, see CRAMBE MARITIMA.

Seal. The law recognises three royal ss., the Great S., the Privy S., and the Signet or Privy Signet (see SIGNET). Since the union with Scotland (1707) there has been but one Great S. of the United Kingdom, but a S. must be kept in Scotland and used to validate all grants which before 1707 used to pass under the Great S. As regards other dominions of the Brit. Empire, there are now duplicate ss. in the keeping of each dominion Prime Minister. The lord Chancellor is the custodian of the Great S. (see CHANCELLOR), unless it be entrusted to a lord keeper or is in commission. Wafer Great Seals, on embossed paper, wax, or other suitable material,

may now be used instead of the Great S. itself to authenticate, *inter alia*, the following documents: writs of summonses to peers and for the return of members of Parliament; royal proclamations (see PROCLAMATION); commissions of the peace and special commissions of oyer and terminer (*q.v.*) and jail delivery (*q.v.*); writs of convocation (*q.v.*); appointments of readers of civil law at the univs., colonial governors, commissioners of inland revenue, colonial judges, and commissioners of customs; royal charters; presentations to Crown livings; theatre licences; grants of pensions to judges, etc. (see Order in Council Feb. 22 and Aug. 8, 1878, *Revised Statutory Rules and Orders*, vol. ii.). In all the above cases the chancellor or keeper (see KEEPER OF THE GREAT SEAL) may still use the Great S. Letters patent for invention are sealed with the S. of the Patent Office.

By the Great Seal Act, 1881, the authority for the passage of documents under the Great S. is sufficiently estab. by a warrant under the sign manual, countersigned by the lord chancellor, or by a prin. secretary of state, or two of the Treasury commissioners, though any document which prior to 1881 could be passed under the S. by the directions of the chancellor himself without the intervention of any other officials may still be so passed (see Halsbury's *Laws of England*). The use of the Privy S. was to validate issues of the royal treasure, the contracting or discharge of a Crown debt, and also as a warrant for letters patent before they passed under the Great S. The necessity for its use in any case was abolished by the combined operation of the Great Seal Act, 1881, and the Statute Law Revision Act, 1898. See also SEALS, ORNAMENTAL.

Seal, name of members of two groups of marine Carnivora, Otariidae, the fur S. (*q.v.*), and Phocidae, the true or earless S., which have an elongated and somewhat pisiform body covered with a short, thick fur, and terminated by a short conical tail. The limbs are flippers adapted for swimming, and are useless on land, the animal moving itself laboriously by wriggling and contraction of the muscles. They are most abundant in Arctic and Antarctic regions, and though they resort to the shore for the breeding season, they spend most of the year in the sea, often travelling immense distances. They are hunted for their oil and leathery skin.

The common S. (*Phoca vitulina*), a Brit. species, is yellowish-grey in colour and about 5 ft. long. It is an animal of high intelligence, and is readily tamed and taught to perform tricks. The Grey S. (*Holichærus grypus*), a much larger animal, breeds in a few localities in N. Britain. Other N. species include the Greenland S. (*P. grælandiæca*), abundant off the coast of Newfoundland, *P. siberica* of Lake Balkal, and *P. caspica* of the Caspian Sea. Peculiar to the S. hemisphere are Weddell's S. (*Leptonychotes weddellii*), the leopard S. (*Stenorhynchus leptonyx*), the crab-eating S. (*Lobodon*

carcinophagus), and Ross's S. (*Ossacophoca rossi*). The monk S. (*Monachus albirens*) is found in the Mediterranean; the chief home of the bladder-nose or hooded S. (*Cystophora cristata*), is between Greenland and Iceland; it has an inflatable sac on the face.

Sea Lavender, see under EVERLASTING FLOWERS.

Sea Laws, compendious name given by legal historians and other commentators of the seventeenth century to various medieval collections of maritime laws or customs. There were a number of these collections or codes embracing the local customs of the ports of the North Sea, the European Atlantic seaboard, and the Mediterranean; but the most famous of these were the *Laws of Oléron*, the *Consolato del Mare* (or *Consulate of the Sea*), and the *Laws of Wisby*. Also of great interest to the student of legal hist. is the *Rhodian*. The basis of all these, as of the law merchant (*q.v.*) generally, was contemporary local custom, which bodies of custom came to be known by the name of the port where they were in operation, as, for example, the Rhodian. Eventually one or two leading ports dominated the coasting trade of all medieval Europe, whence the almost universal use of the judgments of their courts on matters maritime. The Eng. law merchant (*lex mercatoria*) adopted the judgments of Oléron, which were founded on the laws of the commune of that name, and these laws or judgments were incorporated in the *Black Book of the Admiralty*, which classic of Eng. mercantile law dates from the earlier part of the fourteenth century. The laws of Oléron were also adopted by the ports of N. France, Bruges, and other North Sea places. The equitableness and general repute of these laws were so high that merchants repaired to London from all parts to obtain judgments in the Eng. court of Admiralty. The *Consolato del Mare*, said to be Catalan in origin, was the code of S. L. or customs prevailing in the ports of the Mediterranean. It was drawn up in the fifteenth century for the use of consuls of the sea at Barcelona and it consisted of still older customs of Aragonese tns. Prior to their being reduced to writing, and thereby securing increased judicial recognition, they had been introduced into the Mediterranean ports in the same way as the laws of Oléron had been introduced into the ports of the Atlantic and the North Sea. By the end of the sixteenth century they had been trans. into Fr. and, later, into Lat., Dutch, Ger., etc. The laws of Wisby, like those of Lübeck, were a Baltic code, but whereas the Lübeck code influenced only inter-Baltic trade, that of Wisby was invoked by foreign merchants dealing with those of the Baltic ports. Other tns. had their S. L., e.g. Amalfi and Trani, and in England, Ipswich had its rules or body of customs which were acted on in a maritime court in the tn. which was of the nature of a 'plepoudrous' court (i.e. a court in which justice was administered expeditiously or 'while the dust fell from the feet,' or, as in the case of Ipswich,

'from tide to tide,' because merchants could not tarry).

See Sir T. E. Scrutton, *Elements of Mercantile Law*, 1891; W. S. Holdsworth, *A History of English Law*, vol. 1, (3rd ed.), 1922; and also *A Manual of Later Roman Law* (including the Rhodian maritime law), rendered into Eng. by E. H. Freshfield (p. 195 et seq.), 1927; A. R. G. Mac-Millan, *Shipping Enquiries and Courts*, 1929; E. Percy, *Maritime Trade in War*, 1930; H. J. Crump, *Colonial Admiralty Jurisdiction in the Seventeenth Century*, 1931; and D. Muclachlan, *The Law of Merchant Shipping*, 1932.

Sea-lemon, see LORIS.

Sea-lily, see FEATHER-STAR.

Sealing Wax, mixture of resins and colouring matter used for taking the impressions of seals on documents, for fastening packages, etc. The substance used for these purposes in the Middle Ages contained beeswax, Venice turpentine, and vermilion or other colouring matter as its ingredients, but in modern S. W. shellac takes the place of beeswax. Seven parts of shellac are fused with three parts of Venice turpentine, resin, etc., the colour being added when the mixture is liquid, constant stirring being necessary to prevent the colouring matter sinking to the bottom. The liquid is then poured into oiled steel moulds, and when it has set, the sticks are polished by melting them superficially. A mixture of beeswax and resin, etc., is employed for sealing corks into bottles.

Sea-lion, see FUR SEAL.

Sealkote, see SALKOT.

Seal, Lord Privy, in the United Kingdom the fifth great officer of state. Until the reign of Henry VIII. the office was usually held by a churchman. He was appointed originally to keep the privy seal of the king, so that no independent grants might be made without the knowledge of the king's council. His duties were abolished in 1884, and though the office still exists, it is purely honorary. The office is generally held by a senior member of the Cabinet.

Sea Lords, naval lords as opposed to civil members of the Board of Admiralty. As to their duties see under ADMIRALTY.

Seals, Ornamental, were used at a very early date. Many ant. S. have been discovered in Egypt, Arabia, Syria, Mesopotamia, Babylonia, and Assyria. Early S. were usually cylindrical, engraved with religious and emblematical designs, and were rolled on to moistened clay. The Egyptians used S. made from gems, which were known as *khateen*, also scarabs. (see SCARABS). S. are mentioned in the Bible, and the Great Seal of China dates from 248 B.C. The Gks. used first wooden S. and later carved gems. The Romans used S. and made collections of them, known as *dactylothece*. The *bullae*, or round seal-impressions of gold, silver, or lead, first came into use during the time of Constantine. One of the earliest S. of England is a leaden bulla of Coenwulf, king of Mercia, which is dated 800-10. The Great Seal of England dates from Edward the Confessor, 1043. These S. have obverse

and reverse sides, impression is made by clasp the material to be sealed between them. S. are either the stamps made from gold, stone, ivory, wood, bone, glass, or gems, or the impressions from them. Seal impressions have been taken in wax, plaster of Paris, gutta-percha, glass, and leather. S. may be engraved in two ways: in intaglio, which is cutting below the surface, or in relief, which is leaving the design raised. See H. S. Kingsford, *Seals, Helps for Students of History*, No. 30, 1920.



SEAL OF SCARBOROUGH

Sealyham Terrier, first came into prominence in 1910. The breed has short strong legs, and a very flexible body with a deep chest. The jaw is long but square, the eyes dark and round, the ears carried at the sides of the cheeks. The tail should be docked and carried erect; the coat is white in colour. Weights should be between 18 and 20 lb. Intended as a sporting terrier, the S. has become popular as a house dog.

Seaman, Sir Owen (1861-1936), Eng. poet and journalist. Educated at Shrewsbury and Cambridge he held various scholastic appointments. He began to write for the *National Observer*, and in 1897 joined the staff of *Punch*, of which he became assistant editor in 1902, and editor four years later. He wrote humorous verse and parodies. Among the works which he wrote are *Horace at Cambridge* (1891); *In Cap and Bells* (1899); *Borrowed Plumes* (1902); *Salvage* (1908); *War Time* (1915); *Made in England* (1916); *From the Home Front* (1918); and *Interludes of an Editor* (1929). S. was knighted in 1914, and made a baronet in 1933.

Seamanship, term applied to the art of making a vessel ready for sea, and working and managing her properly whilst at sea. The two sides of the vessel are given the technical names of 'starboard' and 'port' (originally larboard). When facing the bow of the vessel the right-hand side is 'starboard', the left-hand side 'port.' The side of the vessel which is receiving the force of the wind is called the windward or weather side, the opposite side being given the name of the lee side.

Sailing vessels are differentiated according to the kind of rigging they have and the number of masts. The main steering apparatus of a vessel is, of course, its tiller, but, in addition to this, it is important to remember that the manner in which the sails are trimmed and manipulated is of very great importance indeed as far as steering the vessel goes. The fore and aft sails have different effects upon the course of the vessel, so that a seaman in sailing his vessel takes care that the sails are set in such a manner that a balance is kept between the fore and aft sails, and at the same time endeavours to obtain a maximum of speed from the manner in which the sails are spread. Tacking is resorted to in order to make progress when the wind is directly ahead. When the wind is light practically all the canvas is spread in order to take full advantage of the little wind there is, but as the strength of the wind increases the sails are lessened or reefed, until, during very heavy gales, the vessel is sometimes running under practically bare masts before the wind. The taking in of sails during a gale is one of the most dangerous tasks of the seaman, and often necessitates the heaving to of the vessel for that purpose. There is an international code of rules which practically governs the right of way on the high seas. Anchors are used to moor the vessel some distance from the land, and the peculiar structure of this implement ensures that should the vessel attempt to break from her moorings it will become more deeply embedded in the bed of the sea. A sea anchor is used when the vessel, usually under stress of weather, is heaved to in mid ocean. It is made of spars and canvas, and hangs from the bow of the vessel in such a way that it keeps it steady and at the same time breaks the force of the waves which would otherwise injure the vessel. See Nicholl (ed.) and Reed, *Seamanship; Admiralty Manual of Seamanship* (H.M.S.O.); P. Clissold, *Elementary Seamanship*, 1936; and *Regulations for preventing Collisions at Sea* (H.M.S.O.).

Seamen, see CREW; CRIMP; MERCANTILE MARINE; MERCHANT SHIPPING; NAVY AND NAVIES.

Sea-mew, or Gull, see GULL.

Sea Monster, The, see CETUS.

Sea Moss, see CARRAGEEN MOSS.

Seams (sewing), see under NEEDLEWORK.

Seance, see under SPIRITUALISM.

Sea-nettle, see ACALYPHA.

Sea-otter, or *Lutra (Enhydra) lutris*, is a carnivorous mammal of the family Mustelidae and sub-family Lutrine. It resembles the common otter, but has flattened phalanges and its hind-feet are fin-like. Its diet is shell-fish, and its habitat the shores of the N. Pacific Ocean, being chiefly found near the Aleutian Is. and Alaska.

Sea Pen, see PENNATULA.

Sea Perch, see PERCH.

Sea-Pheasant, see PINTAIL DUCK.

Sea-pie, see OYSTER-CATCHER.

Sea-pike, or *Centropomus undecimalis*, is an Amer. species (robalo) of Serranidae, closely related to the perches, and con-

sidered as edible. The name is also given to sev. other pike-like fish, such as garfish, barracuda, and hake.

Seaplane, see under AEROPLANE.

Sea Porcupines, or porcupine-fishes, constitute the family Diodontidae, and are characterised by the movable spines on their skin. All the species occur in tropical seas.

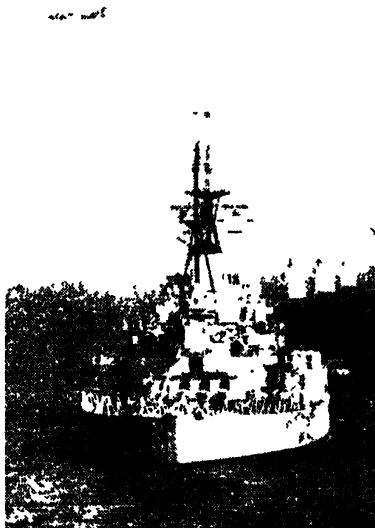
Sea Power, the ability of a nation to move its ships across the seas and deny such facilities to an enemy. In the past it has been exercised by the operations of navies: to-day it is exercised by craft over, as well as on and below, the surface of the sea. Command of the sea is the result of the effective action of S. P. in all its elements, which are fighting strength, strategic positions, and a sufficient merchant fleet (see Adm. Richmond, *The Naval Role in Modern Warfare*, 1940). The nature of the Brit. commonwealth is such that its existence depends upon S. P., which has therefore meant more to Great Britain than to any other nation. If their ships were unable to proceed on their lawful occasions the different units of the commonwealth would starve, and the most vital link binding them together would be broken. The great sea battles in Eng. hist. have been fought more to preserve Brit. freedom of the seas, to enable its ships to move in safety, than for any other purpose. The long wars with France in the seventeenth and eighteenth centuries form a story of struggle for sea supremacy, and Trafalgar was fought, not primarily to preserve the United Kingdom from invasion, but in order to establish command of the Mediterranean. With the conclusion of the Napoleonic wars there was no other nation to dispute Brit. command of the sea, and it was inevitable that this absence of challenge, coupled with financial stringency, should, for a time, have reduced the high state of the Brit. Navy's efficiency. But towards the end of the century there arose from Germany a new challenge to Brit. sea communications at a time when vast changes were taking place in the composition of fleets as they moved from sail to steam. This challenge was undoubtedly influenced by the writings of the Amer. naval historian, Alfred Mahan (1840-1914), who, in a classic work, *The Influence of Sea Power upon History, 1660-1783* (1890), pointed out the historical significance that control of the sea had exercised. This and his subsequent work, *The Influence of Sea Power upon the French Revolution and Empire, 1793-1812* (1892), caused a deep impression and profoundly influenced the naval policy of the great powers, although he did not point out, and it was not admitted until the Second World War, that it was Brit. S. P. which had made the Monroe doctrine (q.v.) of the U.S. a practicable policy.

Great Britain now considered that, in order to maintain her special position, her navy should be the equal in strength to that of any other two powers combined, and this formed the basis of the race in naval armaments that ensued. As, at that time, the naval forces of both the

U.S.A. and Japan could be discounted, Britain's aim was feasible. But when war broke out in 1914, Britain's navy was not so very much superior to that of Germany, and only a greater appreciation of S. P. and how to use it enabled the United Kingdom to defeat her enemies. Although the Gers. had made prodigious efforts to build a fleet strong enough to challenge Brit. sea supremacy, the Ger. high command was so blind to its possibilities that no reference to the navy was made in their main war plan. They assumed that victory could quickly be achieved on land, and that the fleet was, therefore, redundant. In fact, it was never properly used. Grand Adm. von Tirpitz complained: 'Our leaders showed not the least understanding of the nature of sea power, nor of the fate that threatened us.' Britain realised, however, that control of communications on the seas would determine the decision on land. Within a few hours of the outbreak of war, except in the Baltic, all Ger. trade ceased on the high seas; throughout hostilities expeditionary forces were transported to the Continent without loss, and the country was preserved from invasion. Behind 'the shield of Brit. S. P.' the country was able to mobilise its forces for final victory, but the menace provided by a handful of enemy cruisers operating on the trade routes demanded a considerable naval effort before they were finally eliminated. With the development of the U-boat warfare in 1917, the unimpeded use of the sea for Brit. ships was no longer assured, and the struggle to regain control of sea communications under these new conditions was grim and serious, demanding new strategy and new methods (see STRATEGY AND TACTICS). But sufficient supplies crossed the oceans to enable the Allies to carry on and finish the war. A new factor in achieving command at sea had, however, been introduced. In the past command could be acquired by defeating the enemy's fleet because from that source alone came the menace. But now, although the Ger. fleet was bottled up in its harbours, submarines were preventing Britain's uninterrupted use of the sea, and it was also appreciated that, sooner or later, yet another menace would dispute command, from the air. To this new situation the Brit. Navy rapidly adapted itself by leading the way in the construction of aircraft carriers and insisting on control of its own air arm.

The period between the world wars was distinguished by the rise of two other S. Ps.—the U.S.A. and Japan—but a series of conferences (see NAVY AND NAVIES' LONDON CONFERENCE; WASHINGTON CONFERENCE) eliminated a disastrous competition in naval construction that would otherwise have taken place, and Britain was prepared to sacrifice her position of superiority at sea to one of equality with the U.S.A. In practice, and for one cause or another, Great Britain sacrificed much more. Italy, meanwhile, had aspired to maritime greatness, and built a large and powerful fleet to challenge Brit. maritime superiority in the Mediterranean

and, allied to Germany with her by no means inconsiderable naval forces, presented the Brit. Empire with its gravest threat in 1940. But the pattern of the Second World War, in many respects, followed the First. The great decisions on land could only be reached by control of sea communications, but once again the Gers. were too land-minded to appreciate the true significance of S. P. In spite of air developments overseas communications were still dependent on surface ships for reinforcements; for food, fuel, equipment, and all the paraphernalia associated with modern armies and air forces. In 1942



Keystone

SYMBOL OF SEA POWER
H.M.S. Duke of York following an escort

Adm. Raeder, then commander-in-chief of the Ger. Navy, told Hitler that the only way to bring the enemy to terms was by constant successful attacks on their sea routes. Again and again he pressed this contention, and also urged the elimination of the Brit. fleet in the E. Mediterranean, where it enabled an army to be built up and to operate in the subsequent victorious N. African campaign. But the Ger. high command ignored this contention, and the Its. were insufficiently experienced to use their naval weapon intelligently. With the fall of France, indeed, the control of sea communications had become more important than ever, as the ability to defeat Ger. supply depended to a large extent on Britain being able to control at source European essential external supplies, and on the retention of strategic positions from which to exert an effective blockade. Yet, in their submarines, the Gers. had

again a powerful weapon against allied shipping which, as in 1917, might have brought them victory, but neither they nor the IJN had developed that co-operation between their sea and air forces which is to-day essential for the successful exercise of S. P.

Japan had a greater appreciation of the value of S. P., and this assisted her earlier achievements. But the greater preponderance of Amor. and Brit. sea/air power combined gradually forced back the Jap. forces, dissipated Jap. mercantile marine, and inflicted severe defeats on the Jap. Navy. Long before the first atomic bomb fell on Jap. soil Japan's naval and mercantile shipping had gradually disappeared, destroyed by the combined might of allied S. P., whether expressed in terms of surface ships, submarines, carrier-borne planes, or land-based aircraft established by naval supremacy.

Conditions in many respects have changed to-day, and S. P. can no longer give Britain the same protection as in the past, but until the day dawns, if it ever does, when all the fuel we need, all the food and raw materials to support the economy of each part of the Commonwealth and the U.S.A., all the flow of manufactured goods can be transported by air, control of the seas will still remain the dominant factor in the security and strength of the Eng.-speaking countries.

See A. Hurd, *Italian Sea Power in the Great War*, 1918; G. A. Ballard, *The Influence of the Sea on the Political History of Japan*, 1921; H. C. Bywater, *Sea Power in the Pacific*, 1921, and *Navies and Nations*, 1927; Sir G. Callender, *The Naval Side of British History*, 1925; O. Groos, *Seekriegslehren im Lichte des Weltkriegs*, 1929; Sir H. Richmond, *Sea Power in the Modern World*, 1934, and *Statesmen and Sea Power*, 1946; A. J. Marder, *British Naval Policy, 1850-1905*, 1911, and *The Anatomy of British Sea Power*, 1941; Sir R. Bacon, *Modern Naval Strategy*, 1941; J. A. Williamson, *The Ocean in English History*, 1941; and F. H. Hinsley, *Command of the Sea: British Naval History, 1918-45*, 1950.

Searchlight, instrument for projecting a beam of light for a considerable distance, maintaining the highest possible degree of light intensity along the length of the beam. A S. consists, basically, of a source of light, a reflector, and the projector in which the other two components are mounted. The source of light must be of maximum light intensity and minimum size; the reflector collects the light emanating from the source, and by reflection from its surface produces a parallel-sided or cylindrical beam; the projector provides the aperture through which the beam is projected by the reflector, prevents the egress of light except through the projection aperture, and has additional functions such as the mounting for apparatus provided to disperse the excess heat generated by the source of light, etc. The S. in normal use is electrical. In the electric S. the source of light is an electric arc which is mounted in front of a parabolic silvered glass reflector. In order to collect and concentrate the maximum

amount of light the reflector extends as widely across the back of the source of light as possible: the normal practical maximum is an angle of collection of 120° beyond which the glass reflector would collect too much heat and distort, thus reducing its reflecting efficiency or damaging its structure.

Modern S. are principally made in two sizes of reflector diameter, 150 cm. (58½ in.) and 90 cm. (35 in.). Of these two sizes the smaller tends to be relatively more efficient because of difficulties in shaping and polishing the larger reflector, and a greater tendency towards heat distortion in the larger one when in use.

The projector by means of its rotation in the horizontal plane and inclination in the vertical plane affords the operator



Imperial War Museum: Crown copyright

SEARCHLIGHT

A 150 cm. projector fitted with radar, as used during the Second World War. The operator on the right by walking forwards or backwards around the projector turns the searchlight on its platform in a horizontal plane, and by turning the hand-wheel elevates or depresses the beam in a vertical plane.

control of the direction of the beam. S. have to date had two main uses, searching and illuminating, and two minor ones, signalling and 'blinding.' In searching the normal uses have consisted of seeking enemy aircraft, and, in coastal and naval defence, detecting enemy raiding forces, night submarines, human torpedoes, frogmen, etc. The effectiveness of S. in searching for aircraft has been greatly improved by fitting radar to the S. to ensure the illumination of the target as soon as the light is exposed. In illumination S. are used to expose and indicate targets detected by searching, for floodlighting of international boundaries, forbidden zones, etc., and, in addition, are used by ships for illuminating difficult navigation channels, etc.

In the Second World War an additional use of illumination was found by the projection of large numbers of S. beams at a low altitude over a battle area, thus producing 'artificial moonlight'; this gave

sufficient light for night attacks, movement of troops, guns, stores, etc. In signalling S. can be used for flashing Morse code signals for identification purposes, or for such uses as navigational beacons to assist aircraft. 'Blinding' is a minor function of S. automatically incorporated in illuminating targets; it was particularly applied to aircraft about to bomb and, in the Second World War, to special 'lickering' S. mounted in tanks which were used by the Allies for 'blinding' the enemy at defended obstacles such as riv. crossings, etc. During the Second World War the Ger. Army developed and used in action, principally on the E. front, an infra-red S. This apparatus was known as the 'Uhu' or 'Owl', and travelled on a special mounting. The infra-red S. projects a beam of infra-red light, which is invisible to the naked eye, and converts the reflections of this light into a picture visible to the operator on a fluorescent screen.

In the language of physics the ideal for all S. is a perfect parallel-sided or cylindrical beam projected from a point source, because such a beam, assuming its projection through a vacuum, would afford a constant degree of illumination at all distances. The divergence of the beam from its ideal parallel-sided or cylindrical form is taken as the measure of its inefficiency, as the greater the divergence the greater the falling off in illumination until when divergence is complete there is no concentration of the beam at all; the degree of illumination is governed directly by the inverse square law.

Search Warrant can be granted by magistrates under a number of statutes and for very diverse purposes. The most usual occasion for the issue of a S. W. is for the recovery of stolen goods, but a S. W. in this case will not be granted except on the oath of a credible witness that goods have been stolen, and that he has good cause to believe that some person has them in his possession or on premises within the jurisdiction. S. Ws. may also be granted under the Vagrancy Acts, to search lodging-houses for vagrants (*q.v.*) under the Children Acts (*q.v.*), to search for children alleged to be ill-treated or neglected; under the Criminal Law Amendment Act, 1885, to search for women and girls detained for immoral purposes; under the Merchandise Marks Act, 1887, to search for goods to which a false trade mark or trade description has been applied; under the Explosives Act, 1875, to search for explosives in any place whatever and at any time; under the Licensing Acts, to search for liquor sold without a licence whether in an unregistered club or elsewhere; under the Gaming Act, 1815, to search for instruments of unlawful gaming (*q.v.*); and under the Betting Act, 1853, for lists, cards, or other documents relating to betting.

Sea Rod, see **PENNANTULA**.

Seascape, a picture, especially a painting, depicting the sea. In Brit. art one naturally expects to find a large number of S. artists, though it is surprising to find so few really great ones. Indeed, until the

mid-eighteenth century all sea painting tended to follow the traditions of the Dutch artists, a legacy from the days of Vroom and the elder and younger Wm. van de Velde. Eng. painters of that time are only represented by Isaac Sallmaker (1633-1721) and Peter Monamy (1670-1749). The eighteenth-century artists to follow the Dutch tradition include Samuel Scott, painter of the R. Thames, and Richard Wright of Liverpool. A small school also originated in the dockyards of Deptford: predominant here are the family of Cleveleys, especially John Cleveley the younger (1747-86). The most remarkable product of this century, however, was the Lithuanian-Swiss Philip de Loutherbourg (1740-1812), who painted many Eng. landscapes before turning to naval battles in the 1793 war. Antithesis of Loutherbourg is Nicholas Pocock (1741-1821), noted for his use of rich clear blue. Supreme among S. artists is J. M. W. Turner, who produced many scenes, widely varying both in character and quality. Most notable water-colourists are Charles Gore (1729-1809), Samuel Owen (*c.* 1768-*c.* 1857), and John Sell Cotman (1782-1842). Copley Fielding (1787-1855) has an unmistakable style full of life and movement. The finest Ss. of the nineteenth century came from Henry Moore (1831-96), and in them the sea itself takes precedence over the ships: a contrast to the ship-portraiture of Wm. John Huggins (1781-1845). Impressionism has of course left its mark on Ss., from the provocative Amer. Whistler (1834-1903), to Philip Wilson Steer (1860-1942), and the surrealist decorations of Edward Wadsworth. Naturalism has again revived in the government-sponsored works of the official war artists of the two world wars, notable among whom are Wm. Wyllie, Charles Pears, John Nash, and Richard Enoch. See O. Warner, *An Introduction to British Marine Painting*, 1949.

Sea-serpent, one of the few travellers' wonders which science has hitherto been unable to dispose of positively or negatively. Stories of an animal of immense size inhabiting the ocean have been told since remote times, and some of them are clearly accounts of whales, squids, and other known monsters. Various appearances of the S. have, however, been recorded by reputable observers, and not a few scientists are willing to believe in the existence of some animal, possibly a marine reptile, such as the *Pleio-saurus*, supposed to be long ago extinct. Among the more important records are those of Capt. McQuhae, of H.M.S. *Datulus* (*Times*, Oct. 9, 1818, and *Illustrated London News*, Oct. 28, 1848); Capt. A. Hassel (*Graphic*, Aug. 17, 1872); Lt. Haynes, of the Royal Yacht *Osborne* (*Graphic*, June 30, 1877). See Olaf Magnus, *Historia de Guntibus*, 1567; A. C. Oudemans, *The Great Sea Serpent*, 1893; and R. T. Gould, *The Case for the Sea-serpent*, 1930.

Seashore. The S. is of quite special biological interest. Strictly, the littoral zone is that exposed at low tide and covered by the high tide, though it not

only varies with the spring and neap tides, but with storm. It is a region of extraordinary vicissitudes; beyond the constant overflowing by smooth and rough water, with the accompanying movement and wear and tear of land material, as well as the geological submergence and emergence, there is the alternation of air and water as an 'atmosphere' for living creatures; there is alternation of salt water, fresh water, and drought; the changes of temp., the seasonal as well as the diurnal, are more strongly marked than either on land or in the sea. The conditions of life are thus not only stern, but stimulating; life is rich and varied; the struggle for existence trying. Agassiz, Simroth, Moseley, and other authorities incline to the idea that the littoral was the original home of life, and it is almost irresistible to consider it the testing bed from which life is passed to higher forms in the sea, the air, or on land. Sir John Murray has especially emphasised the importance of the 'mud-line,' at an average depth of 100 fathoms, where minute inorganic and organic particles come to rest and form the great feeding grounds of the ocean. Upwards from this we may note the coral zone, 15 to 40 fathoms, where seaweed is not dense, but the carnivorous and debris-eating pop. is extensive; then the laminarian zone, with dense seaweed and inhabs. keenly competing; then the littoral zone proper, followed by the S. in the popular sense. The last, then, are the regions of continual, periodic, and rare submergence respectively.

Among important considerations of seaweed life is that of light. Owing to the great need for attachment, some exist in the deeper water of the S., where they escape the roughest handling, or they are attached on the less exposed and shady surface of rock; the lighter, slender, delicate-threaded seaweeds can withstand the roughness of the water and are found more exposed. This gradation from shade to light is marked by colouring from red through olive-brown, to green in the seaweed. Red laver and Irish moss are common red seaweeds; the bladder-wrack, with its firm attachment, its air vessels, and reproductive organs at the ends of the branches, is the commonest of the olive-brown; oyster green and green laver or sea lettuce of the green type. The laminarian zone is the home of the seaweed (*Laminaria*), where it forms a kind of sea jungle. The seaweeds are a very low form of plant life; there is no woody structure, as its strength would be useless; there is no elaboration of food-carrying tubes in consequence, but the cellular structure is simple; they have no flowers, do not bear leaves and stems, nor in general feed at all from the roots. The red pigments are advantageous in that they absorb heat rays better. Beyond the littoral zone is the region of the marram or sea matweed, sand lyme grass, and sand sedge; these, with long, binding roots, gain a firm foothold, and commence the formation of soil. The sea rocket, sand spurrey, and stonecrops perform similar work, and, when they succeed, bird's-foot

trefoil, thyme, bracken, and rest-harrow mark the beginning of true land vegetation. These plants are all adapted to make the most of rain and resist drought; all are economical of water and have coverings which prevent loss; they can absorb only slowly on account of the saltiness of the water, and are so organised as to keep within safe limits the amount of salt in the sap which retards the formation of starch. The growth is correspondingly stunted and the leaves fleshy. According to Kerner, the crystals of salt found in the leaves of some are exuded and form a protection against evaporation. In the salt marshes are found sea purslane, bracken, sea blite, sea beet, glasswort, sea aster, sea wormwood, thrift or sea pink, sea lavender, sea plantain, sea milkwort, and scurvy grass. Further inland may be found the sea rocket, sea holly, sea convulvulus, hound's-tongue, sea buckthorn, the yellow-horned poppy, and the true sapphire.

Among these plant growths are to be found snails of many kinds, ants, beetles, moths, butterflies, and bees; *Ligia oceanica*, a large slater, is found in the rock crevices with the wingless *Maculis maritima*, while in the pools is the *Anurida maritima*. The cliff birds, not as a rule good fliers, with the exception of the gannet, are large-bodied, web-footed, and have large, strong beaks—the common guillemot, gannet, razor-bill, puffin, kittiwake, gull, cormorant, and slag. On the shore the birds are chiefly waders and are more active, the herring gull, black-headed gull, ringed plover, oyster catcher, and red-shank are all common. Their nests are in shingle, sand, or hidden among the grass of the dunes, but very little attempt is made as a rule to 'build.' In the rock pools the shanny or smooth blenny, which can remain out of water for some hours, the black and spotted gobies, the father lasher or bull-head, and the pipefish, the male of which carries the eggs, are found. Among the common finds on the S. are the five-fingered, the sun, and the brittle star-fishes washed ashore; the stinging jelly-fish and the sea gooseberry are unlovely objects when stranded, but of great beauty when observed swimming. Perhaps the most typical of all shore life are the shell-fish, i.e. the limpet, periwinkle, whelk, cockle, mussel, and oyster; for here the adaptability of life to water and air conditions is well shown, as also in the acorn barnacle and the sea anemones. The shore-crab and pea-crab are more mobile, and the hermit-crab is well known for his means of protection. Almost all the life in the water, almost every phase of colour protection, with change of colour, of modes of hiding, of protective covering, or habits changing with the rapid variations of environment, are exhibited. In connection, too, with the slow movement and constant attachment to the rock of much of the life, should be noted the free-swimming or pelagic stage in the life-hist. of many species, by which means movement of pop. is assured.

For S. in law see next article.
See W. H. Harvey, *Manual of the British*

Algae, 1849, *Physiologia Britannica*, 1851, and *The Sea-side Book*, 1854; J. C. Willis, *Flowering Plants and Ferns*, 1897; W. P. Pyecraft, *The Seashore*, 1920; E. Step, *Shell Life*, 1927; E. G. Boulenger, *A Natural History of the Seas*, 1935; L. R. Brightwell, *Neptune's Garden*, 1937; N. B. Eales, *Littoral Fauna of Great Britain*, 1939; and C. M. Yonge, *The Sea Shore*, 1949.

Seashore, or Foreshore. In law the S. is that land which 'lies within the ordinary flux and reflux of the tides.' The soil which is subject to high spring tides is rather to be considered as part of the adjoining *terra firma* and belonging to the same title. The sea bottom is legally, as well as in common parlance, that soil which is always covered by the sea and never known to become dry by changes in the surface of the sea. Conversely, legal *terra firma* extends down to the ordinary high-water mark. The ownership of the S. or foreshore is in the Crown, unless the subject can prove it to be part of a manor or to have been granted to his predecessors in title either expressly by the Crown or impliedly before the time of legal memory (see LIMITATIONS, STATUTES OF; PRESCRIPTIONS). According to Hale, if any one has prescriptive rights to wreck or royal fish it may be presumed that the S. or foreshore is part of his manor. Where the subject can establish no express or implied grant he must endeavour to prove his claim by such evidence of user extending over such a period of time as leads to the inference of ownership, e.g. exercising a *several fishery*, taking wreck, erecting wharves, enclosing or embanking the sea, erecting groynes, etc. Private ownership in the foreshore is subject to the right of permitting adjoining land-owners freely to pass to and from the sea to their land, and to beach their boats, and to the 'public or persons frequenting a particular place to navigate over the foreshore and anchor there,' provided immemorial user to that effect be shown. But this public right of access for purpose of fishing and navigation does not give a right to use the foreshore for any other purpose, such as putting up bathing machines. See S. A. Moore, *History of the Foreshore*, 1848, and H. G. Lemmon, *Public Rights in the Seashore*, 1934.

Sea-sickness, produced by the motion of a boat on the sea. Many explanations have been put forward as to its cause, the most generally held being that it is due to the unusual stimulation of the sensory organs of the ears, eyes, and stomach in the endeavour to keep the body balanced. Children and old people are not very liable to it, and, as is well known, some people are not susceptible to it at any time. Others are affected only at the beginning of a voyage, while in all cases it disappears on landing. Some people recover from S. after a few days at sea, but others, as in the well-known example of Lord Nelson, never acquire immunity. The pitching motion of the ship is the primary factor, and lying down at full length amidships will often ease the attack. Ice bags, applied to the spine, have been used,

while a tight, broad band around the abdomen has been recommended, as also keeping the eye on a fixed object, but the value of these measures is doubtful. Until recent years no drug had been discovered which acts as a specific against it, and a purgative and toulé before starting, together with a light diet, seemed to be the most efficacious method of easing any possible attack. But a new drug for the prevention and treatment of S. has been devised in the U.S.A. and tested on the Atlantic. It is called 'dramamine,' and is a member of the group of drugs termed 'anti-histamine,' which are valuable in the treatment of such disorders as hay fever and certain forms of food rashes. During the Second World War tests were made of various drugs and a general conclusion was reached that hyoscine was probably the best available. But it appears that dramamine is an improvement on anything yet used. Other tests made suggest that it is less efficacious in air-sickness than in S. Sedative drugs such as phenobarbitone are also helpful. Sometimes the cause of S. may be purely psychic, as when watching a moving boat on a cinema screen. See Holling and others, *Lancet* i, 127 (1944); also VOMITING.

Seaside Grape, see COCCOLOBA.

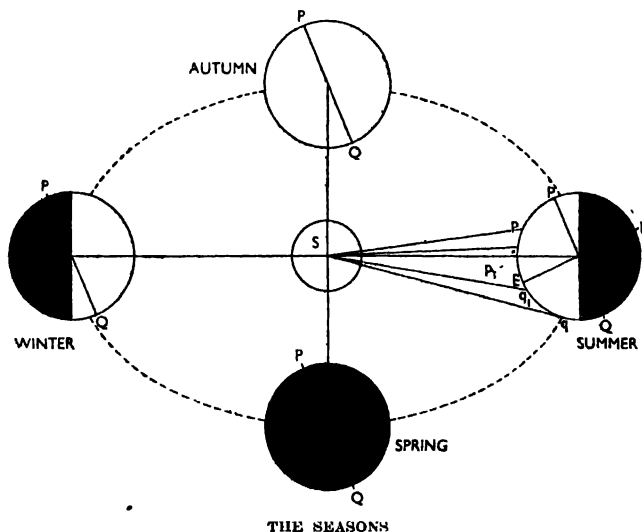
Sea-slug, see under SLUG.

Sea-snakes (*Hydrophidae*), sub-family of Colubridae, are venomous reptiles, all of which are aquatic, and all but one species marine. Their bodies are compressed, and the greatly compressed tail is frequently paddle-shaped. The eyes are extremely small, have round pupils, and the snakes are practically blind when out of water. The poison secreted by the animals is very virulent, and is used by them to kill the fish on which they feed. All the species are viviparous, and inhabit the Indian and Pacific Oceans.

Seasons. The earth moves round the sun in an ellipse the eccentricity of which is about $\frac{1}{60}$, which implies nearly circular motion. The difference between the earth's distance from the sun at its closest approach (perihelion), and its greatest distance (aphelion) is only 3,000,000 m. which is not very large when compared with the earth's mean distance—just over 93,000,000 m. The small difference exercises very little influence on the S., which are due to other causes. Owing to the earth's rotation on its axis in twenty-four hrs. the axis maintains nearly the same direction in space for a long time, though it has a small motion (see PRESSION and NUTATION), but to simplify the explanation it will be assumed that the earth's axis remains parallel to itself. The figure overlaid shows the earth at spring, summer, autumn, and winter; we start with the summer season, PQ denoting the earth's axis, P the north pole, and Q the south pole. It will be seen that in these circumstances the rays of light and heat from the sun S fall more obliquely on regions in the southern hemisphere than they do on regions in the corresponding latitudes in the N. hemisphere. If EE denote the earth's equator and pp, a small strip of land in the N. hemisphere,

the angle pSp_1 can be used to represent the heat and light emanating from the sun which fall on this strip. Now draw an angle qSq_1 equal to pSp_1 , qq_1 being a strip in the southern hemisphere, and q being as far south as p is north. (The sizes of these strips are greatly exaggerated.) Since the angles are equal the same amount of heat and light will travel along the space enclosed by pp_1 as travels along the space enclosed by qq_1 , but it is clear from the diagram that qq_1 is larger than pp_1 . This implies that the same amount of heat and light is distributed over a larger area in the former case, and hence any definite area, say a square mile,

equinoxes, as shown in the figure, neither pole is tilted either towards or away from the sun. The elliptic in which the earth moves lies in the plane of the paper, and the line PQ is inclined to this plane at an angle of $66\frac{1}{2}^\circ$ in all positions. A small model made from a sphere through which a rod is inserted, running from pole to pole, the light from a torch or some other source representing the sun, gives a very good illustration of the cause of the S. The sphere is carried round the light, its axis always pointing in the same direction, and the direct and oblique impact of the rays on certain portions of the sphere, according to its positions, is easily seen



between q and q_1 will receive less heat and light than the same area between p and p_1 . This shows why it is winter in the southern hemisphere and summer in the N. hemisphere in these conditions. For the same reason, if the N. pole is tilted away from the sun, not towards it as in the last case, it will be winter in the N. hemisphere and summer in the southern hemisphere. It is necessary to guard against a fallacy on a matter about which something was said earlier. Although the earth is nearest the sun about Jan. 3, or more than ten days after the winter solstice in the N. hemisphere, or after the summer solstice in the southern hemisphere, this has very little effect (though it has some) in making the summer in the southern hemisphere hotter. The main contribution to the changing S. is the inclination of the earth's axis to the plane of the ecliptic (approximately $66\frac{1}{2}^\circ$), and each pole of the axis is tilted towards and from the sun as the earth revolves round our luminary in a year. At the spring and autumn

Other factors concur in producing the S., amongst which may be mentioned the absorption of the sun's rays by the atmosphere, this being greater in the winter than in the summer at any place, because in the former case the oblique rays must pass through a greater thickness of atmosphere. The distribution of land and water, the height of a place above sea level, the direction of prevailing winds, the presence of oceanic currents, such as the Gulf Stream, etc., have also modifying effects on the main factor in the production of the S.

Sea-spider, *see* PYCNOGONIDÆ.

Sea-squirt, *see* ASCIDIACEA.

Sea-swallow, *see* TERN.

Seathwaite, vil., 8 m. S.S.W. of Kee-
wick, in Lancashire, England. It forms
part of Dunnerdale, and is remarkable
for its exceptionally high rainfall.

Seaton: 1. Seaton Delaval, coast par.
and vil., 6 m. N.N.W. of North Shields, in
Northumberland, England. Pop. (1931)
7877. 2. A favourite seaside resort at

the mouth of the Axe, 9 m. S.E. of Honiton, in Devonshire, England. Pop. 3500.

Seaton, Baron, see COLBOURNE.

Sea Trout, see under TROUT.

Seattle, co. seat of King co., Washington, U.S.A., the largest city in the state, stands on Elliott Bay, in the E. of Puget Sound, 27 m. N.N.E. of Tacoma. To the E. of the city is Lake Washington (50 sq. m.). Hydro-electric power is in good supply. The chief products are furniture, leather goods, lumber products, flour, preserved meat, and foundry and machine-shop products; flying-boats are made at a Boeing aircraft plant. Shipbuilding is carried on and there are a navy yard and dry dock across the sound. On Lake Washington is a naval air station. Among the exports are wheat, timber, flour, fish, machinery, copper, scrap metal, gold, and live-stock. Besides being the port for Alaskan commerce, Seattle is one of the chief Amer. Pacific seaports, and the centre for Federal Gov. services. It is also the seat of Washington Univ. Pop. 368,000.

Sea-unicorn, see NARWHAL.

Sea-urchins (*Echinoidea*), class of the phylum Echinodermata, characterised by the rays not being free as in the star fishes or brittle stars, but united to form a compact spherical heart- or disk-shaped test, which in some cases is flexible and very fragile, and occasionally attains a great length. It is covered with spines, and these, in some instances, are specially modified to act as seizing organs, the free end being divided into two or more pieces moved on one another by special muscles. They may act as cleansing organs, and as temporary means of fixation, while they have been observed in use for defensive purposes. *S.* live on seaweeds and the animals frequenting them. The food is masticated by a highly developed complex apparatus known as the 'lantern of Aristotle,' which consists of five sets of teeth worked by special muscles. Each tooth is strong and bevelled at its free end, and is supported by triangular jaws on either side, a pair uniting and having the form of an inverted pyramid. The teeth are capable of various complicated movements. A common Brit. species is the Edible *S.* (*Echinus esculentus*), which bears some 3000 spines. It and other edible species resemble the crab in flavour when boiled, but they are also eaten raw, cut in four parts, the flesh taken out with a spoon. They were considered a great delicacy by the Romans and Greeks. The *S.* is able to move by means of its tube feet, which end in suckers, and its spines. *S.* reproduce themselves by minute organs which are shed into the water and fertilised there; after hatching they undergo a metamorphosis before reaching the adult form.

Sea Water, see OCEAN AND OCEANOGRAPHY, Composition and Salinity.

Sea Waves and Swell. The Generation of Sea Waves by Wind.—Any wind, even when blowing over a relatively smooth surface such as the sea, is not a smoothly flowing current of air, but contains numer-

ous eddies or masses of air which move to and fro and up and down in the general air stream. When one of these downward-moving eddies impinges on the water surface it starts off a group of small waves in much the same way as does a stone thrown into a pond. The wind blowing over these wavelets quickly damps down those moving against it and heightens those moving with it. This happens all over the windy area, so that in a very short time after the wind gets up the sea is covered with small waves moving roughly in the direction of the wind and with their crests in lines across it. Observation has shown that these waves, in the early stage of their growth, have a mean steepness (i.e. the ratio height/length) of about 1/12; though individual waves may momentarily attain the maximum theoretical steepness of 1/7. Under continuous action of the wind, these wavelets rapidly increase both their height and length, at first in the same proportion so that their mean steepness remains constant at 1/12. However, the increase in length of the waves implies an increase in their speed, since one depends on the other and because the wave-raising effect of the wind depends on its relative speed over the moving wave-tops; this increase in the wave speed causes the height of the waves to increase more and more slowly after they have attained a speed of 1/3 to 1/2 of the wind speed. The wave length also continues to increase, though at a decreasing rate—the steepness of the waves also thus falls until by the time that they have attained their maximum dimensions, when they are moving at a speed slightly less than that of the wind, their steepness has fallen to about 1/25. The maximum height and length of waves in a storm area are roughly 1/50 and 1/2 of W^2 (in feet, where W is the wind speed in knot-nautical m.p.h.). The growth of the waves to this final stage takes a considerable time and requires that the wind should blow in the same direction for a considerable distance—two or three days and 100 to 500 m. respectively for winds of gale force.

In the Atlantic storm waves 25 ft. high or so are comparatively common in the part swept over by depressions; waves with a mean height of 40 to 50 ft. occur perhaps once or twice a year, while individual waves of as much as 80 ft. in length and over 1000 ft. long have very occasionally been observed. The waves of tropical cyclones are probably not so large though more dangerous because of their greater steepness, since the winds in such storms, though stronger, have not the time or distance to raise their maximum waves because these storms are rarely more than 100 m. or so across.

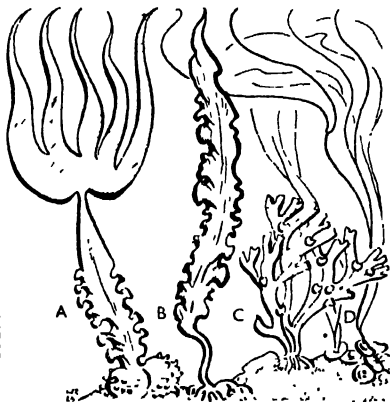
The Travel and Decay of Swell Waves.—Once the waves have been formed in a storm area, they continue to travel along a great circle at the speed appropriate to their length and sooner or later run out of it into areas of comparative calm. They lose height as they travel; roughly about 1/3 of the wave height is lost while the waves are travelling a distance in miles equal to

their length in feet. Thus waves leaving a storm 18 ft. high and 500 ft. long will be still 12 ft. high after going 500 m., 8 ft. high after 1000 m., 5 ft. after 1500 m., and so on. Wind blowing over the waves accelerates this decay, especially if blowing against the waves. Such waves travelling through areas remote from the storms which produced them perhaps sev. days earlier are called swell. As the shorter waves, which are always present riding on the larger waves in the storm area and which contribute so largely to the chaotic appearance of the sea in a storm, are left behind and also decay more rapidly when the waves leave the storm, the resulting swell waves are longer, smoother, and more regular than the original storm waves. After going some distance they are also lower—hence typical swell waves are long, low, and smooth waves of comparatively uniform height such as are almost always to be seen at sea in calm weather.

From the foregoing it is apparent that long storm waves, once formed in a storm, are almost indestructible in the open sea. They travel thousands of miles, and are only destroyed by running into shallow water, where they form breakers and surf on some beach. As the wind is always blowing somewhere or other over every ocean, very rarely is any part of the ocean or of the beaches facing it free from waves. The E. shores of the oceans in the temperate zones, where the prevailing winds are from the W., are particularly affected. The N.W. coast of Africa, for example, frequently experiences surf caused by swell waves over 10 ft. high originating from storms in the neighbourhood of Newfoundland some days earlier.

Seaweed, term applied to the marine algae belonging to the orders Chlorophyceae, Phaeophyceae, and Rhodophyceae. Except in the members of the first-named order, all of which are green, the characteristic chlorophyll green is disguised or concealed by red or brown pigments, the presence of which is so constant in certain groups as to serve for their classification. Many species are or have been used for food. There is little doubt that a number of them are of nutritious value, though some are difficult of digestion. The Purple Laver (*Porphyra vulgaris*), common on Brit. coasts, growing on exposed rocks near low-water mark, contains sugar and has an agreeable acid flavour. It is eaten with roast mutton, and is also served as a savoury on toast. The Green Laver (*Ulva lactuca*), which has thin, broad, plated, glossy-green leaves, is sometimes made into a kind of bread. Carageen Moss or Carrageen (*Chondrus crispus*), is abundant on the N. Atlantic shores, and around the coasts of Ireland and Scotland, where it grows in shallow water. After being washed in fresh water and bleached and dried in sunshine, it is boiled in milk and made into a creamy-looking jelly which is nutritious and subtly flavoured. Agar-agar, which is largely used by bacteriologists as a medium for their culture, is prepared from dried slices of the Ceylon or Jaffna 'moss' (*Plocaria candida*), and

is also used in making jellies, isinglass, and paper varnish. Some species (e.g. *Laminaria*) were formerly burnt for their alkaline ash (kelp), which was used in the manuf. of soap and glass; many are a source of iodine. All round Brit. coasts S. has long been valued as manure, and in some dists. the right to collect it is part of the tenant's lease. Those usually collected consist of *Fucus serratus* and *F. Vesiculosus*, *Laminaria digitata*, and *Ulva lactuca*. It is calculated that the fertilising materials in one ton of fresh S. represent a value of about 10s.,



SEAWEED

A, bulbous-rooted laminaria; B, saccharine laminaria; C, bladder wrack; D, sea thong.

and in one ton of dried S. a value of from 10s. to 65s. The S. should not be left in heaps after gathering, but should be put on to the land at once. It is of the greatest value in the cultivation of mangolds and plants of the cabbage kind. Some exotic S. such as *Sargassum* have a large highly organized thallus bearing a superficial resemblance to the leaves, stem, and root of a higher plant. See also SEASHORE.

Sea-wolf (*Innarhircus lupus*), fish, about 7 or 8 ft. in length; grey or brown, with transverse black or brown stripes. Its formidable aspect and sharp capable teeth constitute its chief resemblance to a wolf.

Sebadilla, see CEVADILLA.

Sebaste, or Sebastive, see SAMARIA.

Sebastian (1554–78), king of Portugal, b. in Lisbon, succeeded his grandfather, John III., and was educated, according to the wishes of the regent, Cardinal Henry, by the Jesuits. Ambitious of martial glory, he led an expedition to Morocco in 1578 to support the claims of Mohammed, the usurper. Like Mohammed and his rival, Abdul-Malik, S. perished in the battle of Alcuzar.

Sebastian, St. (d. A.D. 288), Christian martyr, sentenced to death by Diocletian

because he fortified the waning courage of the ill-fated Christians. The archers, his executioners, did not quite slay him, so he was done to death at length with clubs. The martyrdom of St. S. has been a favourite artistic subject. See V. Knechtling, *St. Sebastien dans l'art*, 1938.

Sebastiano del Piombo (1485-1547), It. painter, *b.* at Venice, studied under Giovanni Bellini and Giorgione. About 1510 he executed some frescoes in the Villa Larnesina, Rome, which belonged to Agostino Chigi. At Rome he met Raphael and then Michelangelo, with whom he afterwards worked. S. was keeper of the papal leaden seal, hence his name. His best works are 'Lazarus' (National Gallery), 'The Visitation' (Louvre), 'Clement VII.' (Naples Museum), and 'Andrea Doria' (Doria Gallery, Rome).

Sebastieh, see SAMARIA.

Sebastopol, see SEVASTOPOL.

Sebenico, see SIBENIK.

Secant, see under TRIGONOMETRY.

Secchi, Angelo (1818-78). It. astronomer, *b.* at Reggio, in Lombardy, was the first to make an elaborate study of the various classes into which the stars may be divided as regards their physical condition. He was a priest living in Rome, but devoted much of his time to stellar observation, and in 1847 he announced his classification of the stars, based on the appearance and disposition of lines in the spectra. Vogel of Potsdam adopted his grouping, with some modification, and it is the basis of the current system.

Secession, see UNITED FREE CHURCH OF SCOTLAND.

Second Adventists, see ADVENTISTS.

Secondary Education, see EDUCATION.

Secondat, Charles Louis de, see MONTESQUIEU.

Second Empire, period in Fr. hist. from Dec. 1852, the overthrow of the Second Republic by Louis Napoleon, to Sept. 4, 1871, the proclamation of the Third Republic after the emperor's surrender at Sedan.

Seconding, in the army, the arrangement by which Brit. officers who are employed on other than military work become supernumeraries in the service, and have their places filled by others. Whilst an officer is seconded his pay ceases, but his promotion is unchecked, and he returns to the first vacancy occurring in his proper rank; his name is shown in army lists in italics. The limit of time during which an officer may be seconded is ten years; he must then return or resign.

Second Republic, period in Fr. hist. from Feb. 24, 1818, the abdication of Louis Philippe, to Dec. 1852, the estab. of the Second Empire.

Second Sight, form of premonition or divination which was at one time largely credited in the Highlands of Scotland, and the belief in which is still prevalent to some extent in the more outlying dists. of that region. The warning may take the form of a visual or auditory hallucination, a dream, or merely a feeling of impending calamity, while the events thus foretold are of varying importance, ranging from

the death of a near relative to the most trivial circumstance. S. S. is regarded as a natural gift, which may not be acquired, and is not bestowed in accordance with any law of heredity, though the seventh son of a seventh son is generally supposed to be specially dowered with the prophetic vision. Scottish hist. supplies numerous instances of S. S., as when Pluto appeared at the Mercat Cross, Edinburgh, on the eve of Flodden, and summoned the nobles who were to perish in the battle. And there are not many Scottish heroes round whom tradition has not woven some such tale of S. S. Apart from historical characters, however, there are sev. highland seers who have attained to something like fame, and whose names were, until recently, spoken with veneration in the N. and W. of Scotland. Defoe's *Life and Adventures of Duncan Cameron* (1728), a soothsayer who lived towards the end of the seventeenth and beginning of the eighteenth centuries, is a record of such a character, and there are many later examples.

Secretan, Charles (1815-95), Swiss philosopher, *b.* at Lausanne; educated there and later under Schelling at Munich. In 1837 he founded and for some time ed. the *Revue suisse*. From 1838 until 1846 he was prof. of philosophy at Lausanne, and at Neuchâtel from 1850 until 1866, when he returned to his native place, remaining there until his death. S. tried to build a rational and philosophic religion in which should be reconciled the ultimate bases of Christianity and the principles of metaphysical philosophy. His works include *La Philosophie de la liberté* (1848); *La Raison et le Christianisme* (1863); *La Civilisation et les croyances* (1887); and *Mon l'opie* (1892). S.'s son, Roger, distinguished himself as an international jurist. See A. Pillon, *La Philosophie de Charles Secrétan*, 1900.

Secretaries, The Chartered Institute of, founded in London in 1891 to provide a professional association for secretaries of incorporated bodies. It received its royal charter in 1902 and the royal patronage in 1911. Among its objects are to ensure a flow of persons qualified by examination to act as secretaries of corporate bodies, to hold conferences and meetings, to issue a jour. (*The Secretary*, pub. monthly), to ascertain and notify the law and practice relating to the profession, to exercise disciplinary powers, and to maintain a library. Branches and students' societies function in all the important centres in the United Kingdom, and in Australia, Canada, New Zealand, S. Africa, and Eire. Admission is by examination and a prescribed period of professional service. The institute has over 20,000 members (5000 in the dominions), and 18,000 registered students. The description of members is 'Chartered Secretary,' and the designatory initials are F.C.I.S. and A.C.I.S. Address: 16 George Street, London, E.C.4.

Secretary Bird (*Serpentarius* or *Cupperanus* . . . *relarius*), aberrant bird of prey, native of S. Africa, and so called on account of the fancied resemblance of the erectile crest of feathers, tipped with

black, to a pen behind a clerk's ear. It is about 4 ft. high, and exceptionally long-legged. The upper surface is grey, shaded on the wing coverts with reddish-brown; the throat is white, and the long tail-feathers black and white. It is much valued, and officially protected on account of the readiness with which it kills poisonous snakes and other noxious animals by means of its powerful feet.

Secretary of State. The S. of S. in England is the constitutional channel of communication between the Crown and subject, though the various Ss. of S. did not become the great executive officers they now are until the business formerly transacted by the Privy Council (*q.v.*, also CABINET) committees was transferred to gov. depts. Historically it may be said that the chancellor is the lineal progenitor of the S. of S. (*see* CHANCELLOR), at least in his clerical capacity. Formerly the chancellor, when as yet far beneath either the justiciar in prestige or the later lord high chancellor, performed all manner of purely clerical work. When his office became exalted this humbler work was performed by a specially appointed confidential clerk or *secretarius*; Henry VI. had two of these 'king's clerks.' In the reign of Edward IV. one of these became known as the head clerk or chief secretary. Later there were at least three secretaries, and in course of time these officials evolved into the modern S. of S. In 1801 there was one for home affairs, one for foreign matters, and a third for war and colonial work. In 1854 a secretary for war was appointed, and in 1858 the office of S. of S. for India was created shortly after the close of the mutiny. The Government of India Act, 1858, in providing for the office of S. of S. for India, also provided that not more than four prin. secretaries and four under-secretaries might sit and vote at the same time in the House of Commons, and that, if more than four were returned at a general election, no one of them could sit or vote until the number was reduced, by resignation or otherwise, to four. This constitutional limit was reaffirmed by the House of Commons (Vacation of Seats Act, 1861). The number was increased to five by the creation of the secretariat for Air under the Air Force (Constitution) Act, 1917, which Act substituted five for four, and the Acts mentioned above were amended accordingly. Then, in 1926, an Act was passed to change the status of the secretary for Scotland to that of one of the prin. S. of S., and the previous Acts were amended so as to provide for a maximum number of six to sit and vote at the same time in the House of Commons. This remained the maximum, the creation in 1925 of a new secretariat for dominion affairs, separate from the colonial secretariat, making no increase, as, in practice, either a peer was appointed to one or other post, or both were held by one individual. In 1917 a secretaryship of state for Commonwealth affairs replaced that for dominion affairs. It may be noted that, as a purely temporary expedient, the New Ministries and Secretaries Act, 1916, suspended for the duration of the First World

War and for six months thereafter all limitations on the number of Ss. of S. or of under-secretaries of state of any gov. dept. who might sit and vote at the same time. A curious position arose in 1929 when it was discovered that there were sitting and voting in the Commons seven under-secretaries of state, this increase arising from the creation of the secretariat for dominion affairs. It was in the nature of things neither possible nor desirable to ascertain which of the seven had last accepted office, and in the result an Act of indemnity was passed to absolve all from penalties, and the number was adjusted to conform to the legal limit. The Ss. of S. are now seven in number: foreign, home, war, colonial, air, commonwealth relations, and Scottish; the office of S. of S. for India was abolished 1947-48. Each S. of S. is assisted by a parl. under-secretary and by a permanent under-secretary and official staff.

In the U.S.A. the S. of S. is a member of the Cabinet and first in line of succession after the president and vice-president. The S. of S. conducts all correspondence with foreign govts. and the governors of individual states. He negotiates all treaties and conventions, has charge of all state papers; he publishes the statutes and resolutions of Congress and proclamations of the President, and is the custodian of the great seal. The first S. of S. was Thomas Jefferson, appointed in 1789.

Secretary of State for Scotland, political head of the Scottish Office. The S. of S. for S. may be a member of either House of Parliament. Practically all Scottish administrative work is controlled by him, while certain Home Office duties (except those relating to mines, factories, workshops, explosives, and vivisection) and Privy Council, Ministry of Health, Board of Trade, and Treasury work have been from time to time transferred to him. Prior to 1926 he was styled secretary for Scotland, but by an Act of that year the office became one of the prin. state secretariats. *See* SECRETARY OF STATE.

Secretary of the Navy, name formerly given to the secretary to the Admiralty. The person holding the office is appointed by the first lord of the admiralty, and receives a salary of £2000 per annum. The permanent secretary of the Admiralty, who is usually a naval officer, is responsible for the discipline thereof; he receives a salary of £3000 per annum.

In the U.S.A. the duty of the S. of the N., who is a member of the Cabinet, is to execute such orders as the president may give concerning the administration of naval affairs. The first S. of the N. was Benjamin Stoddert (1801).

Secret, Discipline of the, see DISCIPLINA ARCANI.

Secretion, substance formed by certain specialised cells from material furnished by the fluid substances of the organism, and discharged by those cells as an excretion or to serve some special function. The structures which carry on the work of S. are known as glands. The salivary glands, as the parotid, submaxillary, sublingual, etc., secrete saliva; the mammary

glands secrete milk; the lachrymal glands secrete tears, and so on. The largest gland in the body is the liver, which secretes bile. The act of S. is often influenced by distant nervous phenomena; thus, the sight of food stimulates the salivary glands to activity.

Secret Service Money. Funds are placed at the disposal of the Brit. Treasury to administer that branch of the gov. service which is concerned with the detection of offences, civil or political, committed or threatened by persons who act in secrecy, and the provision of political intelligence. The Secret Service of the Treasury dept. of the U.S.A. is principally concerned with the detection of counterfeit paper money and coin, and with the protection of the president. There is a special body for the customs service. The whole service is under the direction of the chief of the Secret Service div. The Brit. civil estimates for 1949-50 showed an increase of £500,000 for the Secret Service, bringing the total cost up to £3,000,000. *See also* ESPIONAGE.

Secret Societies, societies the names of whose members and officers are kept secret from the community at large, and societies whose members are required to take an oath binding them to engage in any mischievous or seditious purpose, or to disturb the peace, are 95. Acts passed in 1799, 1817, and 1840 unlawful. Societies for religious and charitable purposes and freemasons' lodges are excepted by the above Acts, as also are declarations approved of by two justices and registered under the Act of 1799. England has not been a frequent seat of agitation in the form of S. S., though Ireland was long notorious for them.

Perhaps the most powerful secret society on the Continent was that of the Carbonari, founded in Naples (1808) by the Republicans to destroy Fr. rule in Italy. It was regarded rather as a branch of freemasonry, but the king of Naples in 1814 soon found the armed *carbonari* useful as a means of driving Murat out of Italy. Later they assisted the Austrians to drive out Fr. domination from Austria, after which the society, gathering in numbers up to nearly 500,000, embraced all the Radical or Liberal spirits in Italy, and even spread into France. Spain also had its *carbonari*, who gathered generally at the Golden Fountain of Madrid. Even as late as 1870 carbonarism had deep and powerful roots in sev. countries, and it was only after the hegemony of the It. republicans under Garibaldi that this society in its original form can be said to have disappeared. Another great It. secret society was that of the Camorra in S. Italy and Sicily, a society which continued to flourish up to the First World War, though numbers of its members had been brought to trial. This society in its objects and effect on It. social life was closely analogous to the Mafia (*q.v.*), and though it practically disappeared under the Fascist regime its members continued to be arrested and put on trial. By a great majority the Alabama state House of Representatives in 1949 approved a Bill,

previously passed by the Senate, to outlaw the wearing of masks by the Ku-Klux-Klan or any similar secret organization. *See also* CARBONARI; KU-KLUX-KLAN.

Secrets, Official, *see* OFFICIAL SECRETS.

Secret Weapon, popular phrase used to denote the more deadly weapons of war evolved by belligerents in the hope of achieving victory. Strictly, however, it should include any unrevealed mechanical invention or adaptation or device, which is calculated to advance a belligerent's war effort. In this wider sense it could be said to include, for example, the legendary wooden horse of Troy and the war-towers which Cyrus drove against the lofty battlements of Babylon. It would include the medieval war-cart, a crude precursor of the armoured car, which, when closed, had the appearance of a peaceful caravan with slits for ventilation, and the first use of the *bouché à feu* or cannon at the end of the bow-and-arrow period of military hist. The military mind has always endeavoured to fashion some mechanical contrivance for hurling a body of armed men into the heart of the enemy's citadel, and some of the above-mentioned devices are in this sense the forerunners of planes and tanks. Coming to much later times, the famous needle-gun of the Prussians, a military breech-loading rifle produced in 1836, but not adopted by the Prussian Army until many years later, had a marked effect on Prussian fortunes in the war of 1871. Again, expanding or dum-dum bullets are an obvious instance of a S. W. The use of poison gas by the Gers. on the W. front in 1915 also illustrates the use of a S. W. in the sense that in view of the Hague Convention it was unexpected. The tank was a well-kept Brit. secret until its successful use at the battle of Cambrai in 1917, but it is doubtful whether it was at that time sufficiently far advanced to have any marked effect on the issue of the war. With over-increasing mechanisation, fostered by scientific research, came the development of ever more deadly S. W.s, and in the Second World War none acquired greater notoriety than the flying-bomb (V 1) and the rocket (V 2) of the Gers. until even these insidious weapons were outmoded by the atomic bomb (*see* ATOMIC BOMB; FLYING BOMB; ROCKET), this last being the product of combined research in Britain and America. Germany's frenzied research for new aggressive inventions resulted in depriving the forces which had to fight her battles, especially the air and artillery arms, of resources, and thereby contributed to the allied victory in the field, the only kind which hist. shows to be final. None the less the dangers faced by Britain from S. W.s were many and formidable, apart from V 1s and V 2s, as the Allies discovered when they overran Germany and so thwarted Ger. plans to sabotage or conceal their research work. Among the inventions of which evidence was found were an infra-red searchlight, rocket-assisted shells, and a scheme, not very far developed, to provide the V 2 rocket with

wings. The Gers. also had a new gas with qualities more deadly than phosgene, and a very light non-inflammable synthetic rubber, valuable for tyres because it is almost indestructible by bullets. In addition to their jet planes the Gers. were also experimenting with a piloted V 1 flying bomb, with a retarded take-off and of much increased accuracy. They had also made advances in devising controlled projectiles directed either from an aeroplane to a ground target or from aeroplane to aeroplane, as well as various radio-controlled anti-aircraft rockets, such as the J 11 *Schmetterling*, which had a range of 32 km. In the sphere of naval construction the Gers. had a torpedo with a range of 80 m. and an acoustic head which 'listened' for its target. There were controlled torpedoes which would follow a zig-zag course with clearly threatening possibilities against zig-zagging ships. There was a glider released from an aeroplane, and in turn releasing a torpedo so that the aeroplane could avoid the blast of a ship's anti-aircraft fire (this was the Blohm and Voss BV 226, which was actually employed against allied shipping in the Mediterranean in 1943); and there was a jet-propelled submarine with an underwater speed of 25 knots, and another with a submerged speed of 15 knots, rendered possible by a new fuel for use as a propellant or as an explosive fuel. It need hardly be said that Britain and America had their S. Ws., but it is obviously against public policy to publish details beyond what has, for example, been made known on the principle of the atomic bomb, which had so profound an effect in hastening the end of Jap. resistance. See A. Ducroix, *Les Armes secrètes allemandes*, 1947, and *Les Armes de demain*, 1948.

Secret Writing, see CRYPTOGRAPHY.

Sector, portion of a circle between two radii. Its area is given by either of the formulae $\frac{1}{2}r^2\theta$, where θ is the angle between the radii measured in radians, or $\frac{1}{2}sr$, where s is the length of the arc subtending the angle θ , r being the length of the radii.

Secularism, materialistic and rationalistic movement started in England by George Holyoake, a working-class agitator, in 1816. Its author defines S. as a 'system of ethical principles,' and says that 'it aims to substitute the piety of usefulness for the usefulness of piety.' Though Holyoake himself had in 1812 been imprisoned for blasphemy, the movement was not professedly anti-theistic or even anti-Christian; but its tendency was certainly agnostic, and speedily became atheistic, especially among its vulgar adherents. S. aimed at establishing morality on a utilitarian basis, and hoped 'to establish those material conditions in which, as far as forethought can compass them, it shall be impossible for a man to be deprived or poor.' In the early seventies Charles Bradlaugh (q.v.) assumed the leadership of the movement, and he rapidly changed the somewhat negative attitude of the original movement into a vigorous anti-Christian propaganda. But the conflict which raged

round his writings did not live till the end of the century, and S. has now become merged in the larger materialistic movement which is being felt throughout the whole of Europe. See G. J. Holyoake, *History of Co-operation in England*, 1875, and *Sixty Years of an Agitator's Life*, 1892; C. Bradlaugh and A. Besant, *The Fruits of Philosophy*, 1876.

Seculars, or more accurately **Secular Clergy**, are those clergy who do not belong to a religious order or congregation.

Secular Variations, see under VITAL STATISTICS.

Secunderabad, former military station, 6 m. N.N.E. of the city of Hyderabad, in the state of Hyderabad, India. Pop. 120,860.

Secundus, Johannes (1511-36), Lat. poet. His family name was Everts, but, like other learned men of the age, he took a Lat. name, S. He early showed a taste for Lat. poetry. The archbishop of Toledo made him his private secretary, and he accompanied Charles V. to Tunis in 1531. His poems are *Elegies, Basia, Epigrams, Odes, Epistles, Funera* (elegies in the Eng. meaning), and *Miscellanies*.

Securities, Interbourse, see INTERBOURSE.

Securities on Heritable Estates, see HERITABLE.

Security, anything given or deposited to secure the payment of a debt or the performance of a contract, as a bond with surety, a mortgage, a pledge, a charge. By the Bankruptcy Act, 1883, a secured creditor has an option; he may either (1) surrender his S. and prove for his whole debt, or (2) he may realise his S., and then, after deducting the net amount realised, prove for the difference (if any), or (3) he may state the particulars in his proof, assess the value of the S., and claim a dividend on the difference, in which case the trustee in bankruptcy is entitled to redeem the S. at the assessed value. The creditor may ask the trustee in writing to declare whether he will redeem or not, and the trustee must, if he elects to redeem, do so within six months. If the trustee is dissatisfied with the creditor's valuation, he can demand a sale of the S., either on such terms as he and the creditor may agree, or as may be fixed by the court. The creditor can only amend his valuation on proof that he made a bona fide mistake or that the S. has altered in value since he put in his proof, and in any case only by leave of the court.

Security Council, see under UNITED NATIONS, CHARTER OF.

Security (International), see ARMAMENTS, LIMITATION OF; LOCARNO CONFERENCE AND TREATIES (1925).

Security, Military, see under INTELLIGENCE, MILITARY, AND SECURITY.

Secyon, see SICYON.

Sedalia, tn. of Pettis co., of which it is the cap., Missouri, U.S.A., 188 m. by rail W. of St. Louis. There are packing houses and railway workshops. Pop. 20,400.

Sedan, tn. and fortress, 12 m. E.S.E. of Mézières by rail, on the Meuse, in the

dept of Ardennes, France. It is an important seat of woollen cloth manuf and there are dye and metal works. Lucerne was born here and here Napoleon III surrendered to the Prussians in 1870. In the Ger invasion of 1940 the Gers held a bridgehead round S. on June 2, where the contact zone joined the main Maginot line and from here they launched their final offensive. Pop 13,500.



New Zealand Government

RICHARD JOHN SEDDON

Sedan Chair, mode of conveyance especially fashionable in the eighteenth century. It was carried by two chairmen on poles had a hinged box in front windows at the sides and a top which lifted so as to enable the occupant to stand up if he chose and to allow the wearing of high heels etc. The name is derived from the locality of Sedan, where the vehicle was first in use.

Sedburgh, market town on the River Wharfe, 9 m E of Kendal in the W. Riding of Yorkshire, England. A market charter was granted to S. in 1251. Carpet yarns are manufactured in the town and the dist is noted for the breeding of spotted dairy shorthorn cattle. Pop 3,000. Hartley Coleridge taught at S. School founded in 1525 by the provost of Eton, Roger Lupton, and endowed with lands connected with a chantry. These lands were forfeited under the Chantries Act of Edward VI. The school itself being saved by the efforts of the master of St John's College, Cambridge. The constitution of the school was remodelled on public school lines and the buildings extended by the endowed Schools Commissioners in 1871. About 380 boys can be accommodated.

Seddon, Richard John (1845-1906), New Zealand statesman, was b in Leicestershire,

England, and eventually started mining in New Zealand. Entering the New Zealand Parliament in 1879, he became premier in 1893. Retaining this office till his death. During his thirteen years of premiership he ruled New Zealand with a liberal and humanitarian policy. He was a vigorous powerful man, much beloved by his countrymen. During the Boer war he offered the aid of the dominion to Great Britain and this marked him out as one of the practical exponents of liberal imperialism which he combined with an intensely patriotic feeling towards New Zealand. See J. Drummond, *The Life and Work of R. J. Seddon* 1907.

Sedonium, see SODIUM.

Sederunt, see ACT, Act of Sederunt.

Sedge, see CAREX.

Sedgemoor, marshy tract between Bridgewater and King's West in Somersetshire, England where the royal forces defeated Monmouth (1685).

Sedgley, town S of Wolverhampton in Staffordshire, England. It is chiefly residential and is situated on the fringe of the industrial Black Country with some coal and fire clay mining and engineering industry. Pop 22,000.

Sedgwick, Adam (1785-1873). English geologist b at Dent, Yorkshire in England. He was educated at Sedburgh and Trinity College, Cambridge, became prof of geology at Cambridge in 1815. He contributed many papers to the Cambridge Philosophical and the London Geological Societies and was an authority on Pleistocene rocks.

Sedimentary Rocks, see ACCRETION ROCKS and GEOL. V.

Sedition, somewhat vague term which may be described as comprising all those offences whether by deed or word or writing which are calculated to disturb the tranquillity of the state and lead ignorant persons to endeavor to subvert the Government and the established laws. The objects of those who stir up sedition are to excite discontent and insurrection and opposition to the Government and to bring the administration of justice into contempt (Harris's *Treatise of Criminal Law*). It is notoriously difficult to fix any particular act or words whether they constitute sedition or not, first because the term S. has been used so widely as to include specific offences e.g. unlawful or seditious meetings and training to arms, and secondly because the objection of seditious disseminators of S. generally meets with the hearty approval of an improving body of contemporary opinion. Since, in the eighteenth and early nineteenth centuries almost any criticism of the gov. was accounted seditious prosecutions on this charge were frequent especially for seditious libel and S. words.

Sedley, Sir Charles (1639-1701) English dramatist b at Aylesford, Kent. Left Wadham College, Oxon without taking a degree. Himself a debauchee and the father of Catherine, countess of Dorchester. Attracted to James II. He wrote licentious though not palpably lewd plays, the best being a comedy entitled *Belshazzar* (1647).

Seduction. The old action for damages for *crim. con.* (i.e. criminal conversation) having been long ago abolished, there is now (apart from the law of divorce) no civil remedy for the mere 'debauchery' of a man's wife or daughter or other female dependant. The action for S. does not even necessarily imply 'debauchery'; the adultery is not a necessary part of the cause of action, though, if proved, it aggravates the damages. The legal remedy for S. is theoretically a commercial one; it is based wholly on the ground of loss of services. Hence the action may be brought for enticing away a female servant as well as a female member of the family who performs household or other services for the plaintiff. A married woman living apart from her husband in her father's house may, for this purpose, be her father's servant, even though that relation might be terminated at any moment by the husband. There must be some evidence, though very little will suffice, of an actual relationship of master and servant between the plaintiff and the female seduced. Partial attendance in the parents' home is enough to constitute service, though if the daughter works elsewhere as a servant at some other time of the day, both her employer and father could maintain actions. When the loss of service or possibility of service is proved, the damages that may be awarded are by no means limited to an amount commensurate with the actual or inferred loss of service, but may be exemplary or punitive (Pollock's *Torts*).

Sedum (*Stoncrop*), genus of ann. or perennial succulent herbs or sub-shrubs (family *Crasulaceae*) with star-like flowers. They are able to store up moisture, and thus can grow in the hottest and driest situations. Eleven species are Brit., and a number are grown in gardens.

Seeckt, Hans von (1866-1936), Ger. general, b. at Schleswig, son of a general. At nineteen he joined his father's regiment, 1st Grenadier Guards, transferring to the general staff in 1899. C.G.S., 3rd Army Corps (Berlin), 1913, as a lieutenant-colonel under Von Kluck he fought in Flanders, 1914. Appointed C.G.S. of the Eleventh Army under Mackensen, Feb. 1915. S. is said to have been the author of the plan for the (Gorlice-Tarnow break-through of May 1915. He assisted in subduing Serbia, and in June 1916 became C.G.S. to the Austrian Archduke Charles. In Dec. 1917 S. became C.G.S. of the Turkish Army, and remained in the E. till the armistice. After Kupp's *putsch*, March 1920, he became commander-in-chief of the Reichswehr, which he built up into a first-class force. He resigned in Oct. 1926, and afterwards supported the Nazi party. His pubs. include *Gedanken eines Soldaten* (1929), *Reichswehr* (1933), and *Deutschland zwischen Ost und West* (1933).

Seed, fertilised and matured ovule; it consists of the embryo and its integuments, and often an endosperm, which is provided for the nourishment of the embryo, and may be farnaceous, oily, or mucilaginous. The embryo, when fully developed, consists of one or more coty-

ledons, a plumule which on germination gives rise to the stem of the future plant, and a radicle, which develops into the root. The flowering plants (angiosperms) are subdivided into dicotyledons, with two cotyledons in the S., and monocotyledons, in which the S. has a single cotyledon; the gymnosperms (e.g. the Scots Pine) have a S. with sev. cotyledons. In angiosperms the S. is always enclosed in a fruit, whereas in gymnosperms it is naked. Amongst flowerless plants (pteridophytes) S. were formed by the extinct pteridosperms ('seed ferns'), but otherwise the pteridophytes reproduce by spores. S. exhibit a variety of aids to their dispersal: frequently they are dispersed whilst still contained inside the fruit, as for instance in the Sycamore and Dandelion; the S. itself may be provided with a wing, as in the Pine, or a tuft of hairs, as in the Willow Herb (*Epilobium*). The vitality of S. is very variable; some such as those of the Willow and the Brazilian rubber can live for only a few weeks, whereas S. of the Indian Lotus (*Nelumbium*) are known to survive for at least 300 to 400 years. There is no foundation for accounts of germination in S. recovered from the wrappings of Egyptian mummies. S. are important articles of commerce, and many of them yield valuable oils (e.g. coco-nut oil from *Cocos nucifera*, linseed oil from flax, *Linum usitatissimum*). The grains of wheat and other cereals are botanically fruits, not S.

Seeland: 1. Correctly **Sjælland**, see **ZEALAND**. 2. Prov. of the Netherlands, see **ZEELAND**.

Seeley, Sir John Robert (1831-95), Eng. historian, b. in London, educated at the City of London School and Christ's College, Cambridge. He was classical master at his old school in 1859, and was appointed prof. of Lat. at Univ. College, London, four years later. He pub. in 1865 *Ever Homo*, a denial of the divinity of Christ, a work that was widely read and excited a great amount of interest. He was in 1869 elected, in succession to Charles Kingsley, prof. of modern hist. at Cambridge, and he held the chair until his death. His study of hist. was based rather upon the state and its policies than upon the acts of individuals. Among his writings were *The Life and Times of Stein* (1878); *The Expansion of England* (1883); *Life of Napoleon* (1886); *The Growth of British Policy* (1895); and *Lectures on Political Science* (1895). See life by A. Rein, 1912.

Seely, John Edward Bernard, see **MORTIMSTONE, BARON**.

Sefton, Earl of, Irish title held by the Molyneux family since 1771. The earl's eldest son is called Viscount Molyneux, and his chief seat is Croxteth Hall, Liverpool. Sefton Park is a suburb of Liverpool.

Segesta, or **Egesta**, name of an ant. city of Sicily, on the slopes of Monte Varvaro, 8 m. W.S.W. of the modern Alcamo. The Athenians were ostensibly prompted to their disastrous Sicilian expedition of 415 B.C. by a desire to assist S. against Selinus. Depopulated by

Agathocles in 307, the tn. threw off the Carthaginian yoke and seceded to the Romans in 206 B.C.

Segesvar (Ger. *Schässburg*), cap. of the co. of Nagy-Kukullo, in Transylvania, Rumania. The Hungarian poet, Petöfi, fell in the course of a Russian victory gained here in 1849. Pop. 12,000.

Segni, see *SIGNIA*.

Segodunum, see *RODÉZ*.

Segontium, Rom. camp, on the outskirts of Caernarvon, N. Wales, along the Beddgelert road. The station covers 3 ac., and is the supposed bp. of Constantine the Great. There is a museum containing many relics found on the site.

Segou, see *SKATU*.

Segovia: 1. Prov. of central Spain, having an area of 2682 sq. m. Rye, wheat, barley, hemp, and flax grow on the fertile plateaus, which are well watered by the Eresma, Duraton, and Cega. There are granite and marble quarries. Pop. 200,800.

2. Cap. of the above prov., 40 m. N.N.W. of Madrid. Successively dominated by Celiborians, Romans, Moors, and Spaniards, it boasts a splendid Rom. aqueduct dating from the time of Trajan (d. A.D. 117), a fortress or alcázar, originally Moorish, a late Gothic cathedral (completed in 1577), and a thirteenth-century Knights Templar church of La Vera Cruz. Pop. 24,300. See D. M. Suirot and P. Burnet, *Au cœur de l'Espagne*, 1932.

Segrave, Sir Henry O'Neal Dehane (1896-1930), Eng. racing motorist, b. at Balmistray, U.S.A., of Irish ancestry. Educated at Eton and Sandhurst, he served in France in the First World War in the Warwickshire Regiment and the Flying Corps. He became technical secretary to the Air Ministry, and private secretary to the director-general of military aeronautics. He was attached to the Brit. aviation mission to Washington in 1918, and left the Air Force in that year. After prize-winning in France and England, reached 231.44 m.p.h. at Daytona, Florida, March 11, 1929, being knighted the same year. He was killed by his overturned motor-boat on Windermere. A S. trophy is given for achievements in transport development. See life by J. W. Day, 1930.

Ségu, or **Segou**, important commercial centre, on the Niger, 400 m. S.W. of Timbuctoo, in Fr. Sudan. It is the chief city of Bambara. Pop. 7600.

Seguidilla, Sp. dance in 3/4 time, performed to the guitar or to singing. It is similar to the bolero or cachucha.

Séguier, Pierre (1501-80), b. in Paris, was *président à mortier* in the *parlement* of Paris from 1551 to 1576. He wrote *De Cognitione Dei et Sui*.

Séguier, Pierre (1588-1672), Fr. chancellor, b. in Paris, was the son of Jean S. and grandson of Pierre S. He rose through various offices to the rank of *président à mortier* in 1633 and that of chancellor in 1635. He was one of the originators, and president, with the title of Protector, of the Académie Française, which held its sittings at his hôtel.

Séguir, Henri François, Comte de (1689-1751), Fr. general, served in Italy during

the war of the Polish Succession, and afterwards in Bohemia and Bavaria, defeating the Austrians at Lichtenau (1745). He also took part in the Flemish campaigns of 1746 and 1747.

Séguir, Joseph Alexandre Pierre, Vicomte de (1756-1805), the second son of Marshal S., b. in Paris, quitted the army for literature. His pub. *Comédies, Chansons et Proverbes* in 1802.

Segur, Louis Philippe, Comte de (1753-1830), Fr. diplomatist and historian, b. in Paris, was the son of Philippe Henri S. He served in the Amer. War of Independence, and later was sent as ambas. to St. Petersburg, where he concluded a commercial treaty of great value to France. He wrote *Histoire de Frédéric Guillaume II.* (1800); *Histoire universelle* (1817); *Histoire de France* (11 vols., 1824-1831); and *Mémoires* (3 vols., 1824).

Seiche. In the lakes of Switzerland in particular, oscillations of the waters, similar to tides, but of different origin, have long been noticed, and the names S. and *rhussen* were locally given. In the case of those of Lake Geneva, Prof. F. A. Forel began careful observation in 1869. They are often masked by the ordinary wave-movement of the waters, but may attain a movement of sev. feet. Forel invented the limnograph, a self-recording instrument provided with the usual barrel and clock-work to give time. The float recorded the variations of height by means of lever and pin, and was protected from surface disturbance by being enclosed in a cylinder connected by pipe to the deep waters of the lake.

Since these observations, attention has been directed to similar phenomena in many lakes, notably those of N. America and of Scotland; the latter in connection with Sir John Murray's exhaustive survey of the freshwater lochs. The S. should be distinguished from the oscillations of the waters of a lake due to earthquakes, such as that of Lisbon (1755), which affected the waters of England and N. America, or to avalanches or landslips. In the case cited the waters of Loch Lomond oscillated through 2½ ft. every 5 min. for some hours. Vaucher, in 1801, concluded that Ss. occur in all lakes, but are not observed. He noted their occurrence, particularly in spring and autumn, but also their great irregularity at any time of the year, and considered them to be due to barometric changes in the atmosphere. Forel found Lake Geneva to be always oscillating, and distinguished transverse oscillation with periods of 10 min., though varying greatly, and longitudinal S. with periods of 73 min. for a unimodal oscillation (like a see-saw about a single central node or point of no vertical movement); of 35 min. for a binodal oscillation (two nodes with the centre of the lake falling as the ends rise, and vice versa); and of shorter periods for multinodal oscillations. A S. may last up to four days depending on the type of oscillation and the initial amplitude which decreases gradually as the motion continues. Lakes Michigan and Superior show oscillations of about 3 in., but these are true tides.

S. are now recognised as due to barometric changes, and appear to be greater with a low barometer. The mode of causation is not understood. Prof. Chrystal examined the observations on the Scottish lakes, and submitted them to very thorough mathematical analysis, showing a relation between the periods and amplitudes, and the contour of the lake bottom and the dimensions of the lake. See F. A. Forel, *Le Léman, monographie limnologique*, 1895; G. Chrystal, *Hydrodynamical Theory of Seiches* (Transactions of Royal Society, Edinburgh, 1905); and W. Hallfuss, *Grundzüge der vergleichenden Seenkunde*, 1923.

Seidlitz Powders, composed of two powders, one wrapped in blue and the other in white paper, are so named because when mixed in water their composition and action resemble those of the natural sparkling aperient water of the spring in the vil. of Seidlitz in Bohemia. The contents of the blue paper, composed of a mixture of 120 grains of the tartrate of sodium and potassium and 40 grains of sodium bicarbonate, are first dissolved in about half a tumbler of water. Then the contents of the white paper, consisting of 38 grains of tartaric acid, are stirred in. The mixture is then drunk while it is still effervescing through the evolution of carbon dioxide, when it acts as a mild cooling aperient.

Seignette's Salt, see ROCHELLE SALT.

Seignorage, anct. prerogative of the Crown, whereby it claimed a percentage upon every ingot of gold and silver brought to the Mint to be coined or exchanged for coin. In a wider sense S. denotes anything claimed by the sovereign or by a feu superior in virtue of prerogative right.

Seine, dept. of N. France, formed in 1790 out of a small portion of Ile de France. It is divided into Barrons, Paris, Saint-Denis, and Sceaux. It has an area of 185 sq. m., of which Paris occupies one-sixth, and is traversed by the R. Seine from S. to N.W. The raising of vegetables for the Paris market is the prin. industry, and in manufl. the dept. is pre-eminent, the chief being glass works, distilleries, chemical and dye works, breweries, porcelain, and india-rubber. Pop. 4,775,700.

Seine (Lat. Sequana), important riv. of France, rising in the E. slope of the plateau of Langres near the vil. of Chancéau. It has a course N.-westwards, and having traversed the depts. of Côte-d'Or, Aube, Marne, Seine-et-Marne, Seine-et-Oise, Seine, Eure, Seine-Inférieure (a distance of 481 m.), it enters the Eng. Channel by an estuary 7 m. wide. Among its many tribs. are the Aube, Marne, Oise, Epte, Yonne, and Eure. The S. is navigable to the confluence of the Aube, 360 m. from the mouth, for small sea-going vessels to Paris, and for large vessels to Rouen, below which it is dyked so as to admit vessels of 20-ft. draught.

Seine-et-Marne, dept. of France, drained by the Seine and the Marne, with their numerous tribs. It is divided into three arrons., Melun, Meaux, and Provins. Area 2275 sq. m. The surface is fairly level;

there is much agriculture, and the dept. is noted for its cheese (Brie), roses, and wine. Its cap. is Melun. Pop. 407,100.

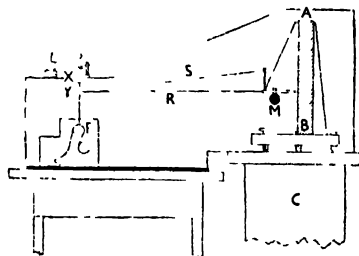
Seine-et-Oise, dept. of N. France, drained by sev. tribs. of the Seine, has an area of 2184 sq. m., and is divided into five arrons., Versailles, Corbell, Mantes, Pontoise, Rambouillet. The surface is level, with many forests. Agriculture flourishes, and porcelain, beer, and paper are manufactured. Cap. Versailles. Pop. 1,114,900.

Seine-Inférieure, dept. of N. France, bordering on the Eng. Channel. It has an area of 2418 sq. m., and is divided into three arrons., Rouen, Dieppe, Le Havre. The surface is well-cultivated plateau land. The fisheries are important, and Rouen and Havre are industrial centres producing chemicals and machinery. Cap. Rouen. Pop. 846,100.

Seine-net, see under FISHERIES, SEA.

Seisin, in the feudal tenure (q.v.) of land, denoted the possession of a freeholding, and the possession which alone was recoverable in a real action (see PERSONALITY, REAL PROPERTY, and SCINTILLA JURIS). By the right of primer S. a sovereign enjoyed the revenue of a deceased tenant-in-chief for a period, usually a year; the custom was abolished in 1660 in England.

Seismograph and Seismology. The seismograph is an instrument for recording automatically the displacement in the earth's crust caused by tremors or earthquakes. The actual movement of the earth at a station in a safety zone, i.e. far removed from an earthquake area, is of the order of $\frac{1}{16}$ in., so that a delicate instrument is required to detect and magnify any such movements.



~EISMOGRAPH

The actual records taken are (a) the horizontal and vertical components of the displacement produced, (b) the components of a rotation about these axes. In most stations the former alone are measured and the horizontal components are the more important. One S. is required for the measurement of each component. The most popular seismograph is that due to Milne, the pioneer worker in seismology. The essential features of Milne's instrument are shown in the accompanying figure. *AB* is a massive iron pillar that is rigidly mounted on a table that rests on three levelling screws. *C* is a concrete block that is firmly embedded in

the ground. *R* is a light aluminium rod, or boom, that is pressed against a pivot fixed to the iron pillar. A mass *M*, about 1000 gm., is suspended from the rod, and is chiefly responsible for the inertia of rotation about the vertical axis. The boom is maintained in a horizontal position by means of a tie fixed to the pillar, and by means of the light silk cord *S*. At the extremity *Y* there is a narrow slit parallel to the boom, while *X* is a narrow slit at right angles to the plane of the paper. In this way the light from the lamp *L*, that is reflected by the mirror *G*, passes through the narrow gap between the slits and illuminates a small patch on the bromide paper *F*. A clockwork arrangement drives the bromide paper slowly over the drum shown in the figure. The component of the displacement of the earth's crust below *C* in a horizontal direction at right angles to the plane of the paper is communicated to the pivot and magnified by the subsequent rotation of the boom. The slit *Y* moves with the boom, and therefore the spot of light on the bromide paper shifts, and a wavy trace is made as the boom slowly oscillates to and fro. The magnitude of the displacement can be deduced, and the locality and the magnitude of the original disturbance ... determined from the combined readings of the various seismographic records.

Explorations for oil by the seismic method have been extensive. Through the surface layers of the earth are sent artificial earthquakes; the effect of the rock formation upon the waves enables the character and thickness of the former to be deduced from the readings of the seismograms. Thus may be located domes of porous material where mineral oil is likely, surmounted by impervious shale which forbids the escape of oil. The Eakring oilfield of Nottinghamshire, England, was thus discovered. New coal-fields have also been found, as in central Lincolnshire, and elsewhere. See also under EARTHQUAKES. Full details of seismographs used in observatories will be found in J. B. Macelwane's and F. W. Schon's, *Theoretical Seismology* (Part II.), 1932, in P. Byerly's *Seismology* (chap. viii.), 1912, and in J. B. Macelwane's *When the Earth Quakes*. See also J. Milne, *Seismology*, 1898; G. W. Walker, *Modern Seismology*, 1913; and K. E. Bullen, *An Introduction to the Theory of Seismology*, 1947.

Seistan, see under PESHAWARAN.

Sejanus, *Sejanus* (d. A.D. 31), Praetorian prefect, b. at Vulturni in Etruria, the son of Seius Strabo. He gained great influence over Tiberius. After sev. years he formed the design of obtaining the imperial power, and procured the poisoning of Drusus, the son of Tiberius by his wife Livia, whom he had seduced. Tiberius at last began to suspect the designs of S. The Senate decreed his death, and he was immediately executed.

Sekondi, port of the Gold Coast, Brit. W. Africa, between Cape Coast and Dixcove. It includes Takoradi, the chief harbour of the colony. Like other coast

tns, its sanitary conditions have been greatly improved; it has a pipe-borne water supply, and is lighted by electricity. Pop. 22,500.

Sela, see PETRA.

Selachians form a large group of fishes, including sharks, rays, chimeras, and many fossil fishes. S. are divided into five orders: (1) *Pleuronotrygii*, found in the Upper Devonian of Ohio. They are probably ancestral forms. (2) *Acanthodii*, known from fragments in the Upper Silurian and Lower Permian. This group probably diverged from the common stock very early in hist., forming a highly specialised branch which became extinct. (3) *Ichthyotomi*, found in carboniferous and permian rocks, is the only fossil order of S. having claspers. The *Ichthyotomi* and recent S. probably descended from a common ancestor. (4) *Euselachii* include the majority of living S. At present there is no definite evidence of their origin earlier than the Triassic rocks. (5) *Holocephali* consist of a few living chimeras, and many and varied fossil forms in the Uretaceous and Eocene. Some occur in the Triassic.

The *Euselachii* are subdivided into the *Pleuronotmata*, the sharks, and the *Hypnometata*, the rays, and these are again divided into families. The gill clefts of sharks are lateral; the anterior margins of the pectoral fins are free, and the eyes have free margins. The gill clefts of rays are ventral; the anterior margins of the pectoral fins are fused to the head or body, and the upper margins of the eyes are not free. Five pairs of open gill slits are usually present, but some sharks have six or seven pairs. The shape of the body varies considerably. Some forms, like the blue shark, are adapted for great speed in the open sea. Others, like the carpet shark, are adapted for slow movement on or near the ocean bed, and rely on protective coloration and strategy to secure their prey. Others, like some rays, live on the floor of the sea, but are able to move rapidly by up and down strokes of their pectoral fins. These fish dart on their prey, cover it with their bodies, and devour it at leisure. Most S. lay few eggs, each protected by a horny capsule. The Greenland shark is the only species laying numerous small unprotected eggs. Some S. are viviparous.

Selaginella, large genus of Lycopods. *S. selaginoides*, the only Brit. species, is a slender, moss-like plant, with narrow, pointed leaves, growing in wet, stony places. Nearly all the other species, some 300 in number, are natives of tropical America, and many, of elegant appearance, are grown in the stovehouse and greenhouse.

Selangor, state of the Federation of Malaya (until recently described as the Federated Malay States) (see MALAYA), under Brit. protection, with an area of 3160 sq. m. It lies at the W. extremity of the Malay peninsula, between Perak to the N. Pahang to the E., and Negri Sembilan and Malacca to the S., and stretches about 85 m. inland from the straits of Malacca. It has mts. on its E.

frontier with valuable tin mines, but consists for the most part of lowlands traversed by the Selangor and Klang Rts. Rubber and tin are the staple exports, and there are coco-nut plantations. Kuala Lumpur (*q.v.*), situated inland on the main road and rail routes from Singapore to Penang, is the seat of gov., and was also cap. of the former Federated Malay States. This fact, coupled with its central position, made it the most important tn. in the Federated Malay States. Port Swettenham, named after Sir Frank Swettenham (*q.v.*), is the prin. port of Selangor, at which ocean-going steamers of most of the large shipping lines visiting Malaya call regularly. Little is known of the S. coast during the period of Portuguese ascendancy. The Dutch built a factory for trading in tin at Kuala Selangor. The first sultan of Selangor seems to have been Raja Lumu, son of Daing 'Chelak, who became sultan in 1743, with the name of Salihuddin Shah; his descendants have since succeeded to his throne. Selangor made a commercial treaty in 1818 with the E. India Company at Penang. In 1871 anarchy prevailed amongst the Malay chiefs of Selangor, and pirates attacked the coastal trade. In the result the sultan was glad to accept a Brit. resident, and to receive the protection of Britain. Selangor was occupied by the Jap. from early 1912 until Aug. 1945. Pop. 701,500.

Selaparan, *see* LOMBOK.

Selborne, Sir Roundell Palmer, first Earl of (1812-95), Eng. lawyer, *b.* at Mixbury, Oxfordshire, was educated at Rugby, Winchester, and Trinity College, Oxford, and was called to the Bar in 1837, taking silk twelve years afterwards. He entered Parliament in 1847 as a Conservative, but gradually drifted to the Liberal party, and in 1861 became solicitor-general in Palmerston's administration. From 1863 to 1866 he was attorney-general. In 1866 he declined Gladstone's offer of the Wool-sack because he could not support the disestablishment of the Irish Church. That Act being passed, however, he consented to become lord chancellor in 1872. He held the office for two years, and was again appointed, 1880-85. He was a great and able lawyer, and an excellent judge. The Judicature Act of 1873 was his work: it estab. in their modern form the supreme and high courts, simplified procedure, and correlated law and equity. His autobiography was pub. posthumously (1896-1898).

Selborne, William Waldegrave Palmer (1859-1942), second Earl of Eng. statesman and administrator, eldest son of first earl. He was educated at Winchester and at Univ. College, Oxford. Elected M.P. as Liberal for E. Hampshire, 1885-92, in 1886 he seceded from the Liberal and joined the Liberal-Unionist party; from 1892 till 1895 he sat for W. Edinburgh. S. succeeded to the earldom in 1895. From 1895 till 1900 he was under-secretary for the colonies; from 1900 till 1905, First Lord of the Admiralty; from 1905 till 1910, governor of the Transvaal and Orange Riv. Colony and high commissioner for S. Africa;

from 1915 to 1916, president of the Board of Agriculture and Fisheries.

Though he did not sign the contract for the first Dreadnought, S. set up the Designs Committee which initiated the 'all-big-gun' ship. As governor in S. Africa it fell to him to try and make a success of his administration at a time when Liberals at home had been presented with a powerful platform cry on 'Chinese Labour.' Despite the Boers' hostility to the crown colony regime, S. at least won their personal respect and affection. His term of office, however, entered on a more auspicious phase with the achievement of S. African Union. The document known as the S. Memorandum, on the principles of union, was wholly his work (dated Jan. 7, 1907). In 1909 he accompanied the Boer delegates to London and helped the Brit. Gov. with his advice in its task of passing the South Africa Act of 1909. In that year he was rewarded with the Garter for his services.

Selborne, vil. of Hampshire, England, the bp. of Gilbert White (*d.* 1793), 4½ m. S.S.E. of Alton station. S. Hill, between S. and Newton Valence, where White made many of the observations recorded in *The Natural History of Selborne*, became the property of the National Trust in 1932.

Selborne Society, association formed to protect the Eng. countryside and wild life, taking its name from the vil. whose natural hist. was described by Gilbert White (*q.v.*). Founded in 1885 by Mr. and Mrs. George Muggrave, it was the first association to advocate the protection of birds, the preservation of plants, and of the other amenities of the countryside. Among its early supporters were Tennyson (*q.v.*), who was president until his death, Ruskin, and Browning (*q.v.*). In 1904 the S. S. founded one of the first bird sanctuaries for the ordinary birds of the country in the Brent valley. As part of its educational programme it has arranged lectures, distributed leaflets to schools, and organised rambles and visits to historical buildings. It later founded a second bird sanctuary, including a lake, adjoining the headquarters of the society at Ilanwell. Pubs. include *Selborne Society Letters*, a monthly magazine pub. from 1885 to 1887 and 1891 to 1909; *Nature Notes*, 1888-90; *The Selborne Magazine*, 1909-25; also monthly magazines. The secretary ed. *Flora Selbornensis*, the only one of White's natural hist. diaries not in the Brit. Museum, and pub. it in facsimile in 1911 in the society's name.

Selby, Viscount, *see* GULLY, WILLIAM COURT, VISCOUNT SELBY.

Selby, mkt. tn. on the Onso, 14 m. S. of York, in the W. Riding of Yorkshire, England. Oil-cake manufs., flour-milling, and sugar-refining are the chief industries. The historical church of St. Mary, which belonged to the Benedictine Abbey, founded in 1069, was restored, after being damaged by fire in 1906. Pop. 10,400.

Selden, John (1584-1654), Eng. jurist and author, *b.* at Salvington in Sussex, was educated at Chichester and at Hart

Hall, Oxford. When about nineteen he was admitted a member of Clifford's Inn, and in 1604 removed to the Inner Temple. At twenty-two years of age he wrote his first pub. treatise, the *Analeton Anglo-Britannicon*, a work which gave him an immediate reputation. He first appeared in the House of Commons as member for Lancaster in 1623, and in 1625, on the accession of Charles I., in the Parliament which assembled at Oxford, he sat for Great Bedwyn. S. was again returned for Bedwyn in Charles's second Parliament. He was one of the members appointed to prepare the articles of impeachment against the duke of Buckingham, and was also named a manager of the prosecution. S. defended Sir Edward Hampden, who had been imprisoned for refusing to pay a forced loan. In Charles's third Parliament, which met in 1628, he was returned member for Ludgershall. He took an active part in the discussions which now occupied the House of Commons on the levying of tonnage and poundage, and in the drawing up of the Petition of Rights. Parliament re-assembled in Jan. 1629, but it was soon dissolved by the king. S. and some others were committed to the Tower, but S. was released in 1634. Soon after he appears to have approached the court party, and to have gained even the favour of Charles, to whom he dedicated the treatise *Mare clausum* (1635), an answer to Grotius's *Mare liberum*. In the Long Parliament, which assembled in 1640, he was returned a member by the univ. of Oxford. He sat on the committees of the Lower House which undertook the proceedings against Strafford. Throughout his life S. was devoted to retirement and to literary pursuits. His last public acts were the discussions in which he took part in the Assembly of Divines at Westminster. In 1643 he took the covenant, and in the same year the parliament made him keeper of the rolls and records in the Tower. He remained in Parliament after the execution of the king, but withdrew from public affairs as much as possible, and, though requested by Cromwell, declined to write an answer to the *Eikon Basilike*. S.'s *Dissertation on Fleets*, which, like most of his works, is written in Lat., shows him to have been a learned lawyer. Whitelocke, his biographer, Wilkins, Baxter, and Clarendon all bear testimony to the excellence of his character and his learning. *The Table Talk* was ed. by S. H. Reynolds, 1892. His other writings include *England's Epitomis* and *Janus Anglorum* (1610); *Tithes of Honour* (1611); *History of Tythus* (1617); *De diis Syris* (1617); *De successionibus* (1631); *Concerning the Rights and Privileges of the Subject* (1642); and *Privileges of Baronage* (1642). See also G. W. Johnson, *Memoirs of John Selden*, 1883 84, and H. Klee, *Grotius and John Selden*, 1916.

Selection, see DARWINISM; SEXUAL SELECTION.

Selene (Σελήνη), in Gk. mythology the goddess of the moon. She was the daughter of Hyperion and Theia, and sister of Helios and Eos, and is said to

have been the mother of Pandora by Zeus. Later S. was identified with Artemis, Apollo's sister.

Selenga, riv. of Asia, in Siberia and Mongolia. It rises in the Khangai Mts., and flows into Lake Baikal. Its length is about 800 m., and it is navigable for about 200 m.

Selenite, crystallised variety of gypsum ($\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$). It occurs in large transparent crystals, with perfect cleavage like mica. Thin plates of S. are flexible, but not elastic (hardness 2; sp. gr. 2.3).

Selenium, chemical element, symbol Se, atomic number 34, atomic weight 79.2, closely related to sulphur (q.v.) and tellurium (q.v.). It is widely distributed, though in small quantities, the prin. ores being selenides of such metals as silver, lead, and copper. It was discovered by Berzelius in 1817, who gave it its name, meaning the 'moon' element, because it resembled the then recently discovered element tellurium (named after the earth, Lat. *tellus*). Nowadays it is extracted from a deposit left in the lead chambers of sulphuric acid works, and from the anode mud obtained in the electrolytic refinement of copper. Some 250,000 lb. are produced annually, there being a commercial demand for S. and S. compounds in glass-making (to decolorise the green tint caused by iron), in pottery, and in cinematography, etc. (see SELENIUM CELLS). S. exists in sev. allotropic forms (see ALLOTROPY), e.g. red S., grey S., and 'metallic' grey S.; the last is the form used in S. cells. S. burns in the air, forming S. dioxide, SeO_2 , and if heated in hydrogen forms *hydrogen selenide*, H_2Se , a poisonous gas with a fetid smell. *Metallic selenides*, e.g. silver selenide, Ag_2Se , can be prepared by heating the metal with S., and in other ways.

Selenium Cells. 'Metallic' selenium (q.v.) does not conduct electricity in the dark, but when illuminated it becomes a conductor, and its conductivity is proportional to the intensity of illumination. This fact has been made the basis of a large number of ingenious devices, worked by 'cells' containing selenium. All S. C. are included in an electric circuit in such a way that when the selenium is illuminated a current flows, and is usually made to work or cut off a relay in a more powerful circuit, which carries out the desired operation. Thus street lamps may be made to light automatically at dusk and to extinguish themselves at dawn, and similar devices are used on buoys, small lightships, etc. In the optophone, invented by Fournier d'Albe, the selenium cell has been employed to enable blind persons to read ordinary print by variations in sound, while in sound films it is used for reproducing speech, etc. No satisfactory explanation of the remarkable behaviour of selenium has yet been advanced; it should be noted that the other allotropic forms of the element do not possess it. See F. d'Albe, *The Moon Element*, 1907.

Seléstat (Ger. Sohlétstadt), tn. in the dept. of Bas-Rhin, France, on the R. Ill. There are metalworks. Pop. 10,900.

Seleucia, name of six anct. cities of Asia, the most important being that built by Seleucus on the Tigris about 312 B.C.

Seleucidae, kings of Syria, so called from the founder of the dynasty, Seleucus I.:

Seleucus I., surnamed *Nicator*, was the founder of the Syrian monarchy, and reigned 312-280 B.C. He was the son of Antiochus. In the second partition of the provs. which followed, S. obtained Babylonia. He afterwards conquered Susiana and Media. In 308 S. formally assumed the regal title and diadem. Having leagued himself with Ptolemy, Lysimachus, and Cassander against Antigonus, he obtained, by the defeat and death of that monarch at Ipsus (301), a great part of Asia Minor as well as the whole of Syria, from the Euphrates to the Mediterranean. In 293 he consigned the gov. of all the provs. beyond the Euphrates to his son Antiochus, upon whom he bestowed the title of king. In 286, with the assistance of Ptolemy and Lysimachus, he defeated and captured Demetrius, king of Macedonia, who had invaded Asia Minor. For some time jealousies had existed between S. and Lysimachus; war followed and terminated in the defeat and death of Lysimachus (281). S. now crossed the Hellespont in order to take possession of the throne of Macedonia, which had been left vacant by the death of Lysimachus, but he had advanced no further than Lysimachia when he was assassinated (280) by Ptolemy Ceraunus.

Seleucus II. (246-226), surnamed *Callinicus*, was the son of Antiochus II. He had to contend in war against Ptolemy, Euergetes, Antiochus, Hierax, and the Parthians, but in the last campaign he was defeated by Arsaces, king of Parthia. He was accidentally killed by a fall from his horse.

Seleucus III. (226-223), surnamed *Ceraunus*, was assassinated by the soldiers after a reign of three years.

Seleucus IV. (187-175), surnamed *Philopator*, was the son of Antiochus the Great, whom he succeeded. No glorious events crowned his reign, his father having just suffered a crushing defeat at the hands of the Romans.

Seleucus V. assumed the crown in 125 on hearing of the death of his father, Demetrius II., but was in turn assassinated by his mother's (Cleopatra) orders for venturing such a step.

Seleucus VI. (95-93), surnamed *Epiphanes* and *Nicator*, the son of Antiochus VIII. His first act was to slay his uncle Antiochus Cyziceus, who laid claim to the throne, but he was himself defeated and expelled from Syria by Cyziceus's son, Eusebes. Having taken refuge at Mopsaustia in Cilicia, he was burned to death by the people, who were provoked by his tyranny.

See also under **ANTIOCHUS**.

See E. K. Bovan, *The House of Seleucus*, 1902.

Self-defence, see under **ASSAULT**.

Self-denying Ordinance was passed in 1645 by the influence of Cromwell, during a critical period of the Civil war. It enacted that every member of Parliament

should resign civil or military office conferred by either or both of the Houses, or by authority derived from them. Thus Essex and other Presbyterians were removed and replaced by Cromwell's nominees, and since reappointment was allowed, Cromwell became cavalry commander.

Self-determination as a term was applied in the first place to an individual who claimed the right to exercise his will as an individual, and it thus became associated with 'free will' as distinct from the doctrine of predestination. But in the First World War the word acquired a political significance, meaning the right of a nation to choose its own polity or form of government and, generally, to develop its own political institutions. The idea was brought into notoriety upon the occasion of the Russian revolution, and formed the basis of Kerensky's foreign policy in 1917. President Woodrow Wilson employed the term in his 'Fourteen Points' (*q.v.*). The treaty of Versailles endeavoured to embody the principle, and the League of Nations on the question of transferences of ter. made them subject to plebiscites (see **PLEBISCITUM**), though in the cases of Alsace-Lorraine, Posen, and W. Prussia such machinery was not used. Plebiscite verdicts, however, directed the transfer of Allenstein and Marienwerder, Upper Silesia, and N. Schleswig, and in 1934 of the Saar. The principle has undoubtedly suffered a set-back through the manifest inability of small nations to defend their independence in the conditions of modern warfare. See W. Phillips, 'Europe and the Problem of Nationality' in the *Edinburgh Review*, 1915; B. Russell, *Principles of Social Reconstruction*, 1917; K. Renner, *Das Selbstbestimmungsrecht der Nationen*, 1918; H. E. Barnes, *National Self-determination and the Problems of the Small Nations*, 1919; *Plebiscites*, issued by the Historical Section of the Foreign Office, 1920; S. Wambaugh, *A Monograph on Plebiscites*, 1920, and *Plebiscites since the World War*, 1933; J. Wlassics, *The Right of Self-determination*, 1922; particularly E. H. Carr, *Conditions of Peace*, 1912, and S. Szende, *European Revolution*, 1915.

Selim, sultans of Turkey:

Selim I. (1467-1520), sultan of Turkey, son of Bajazet II., whom he dethroned by the aid of the janissaries (1512). He declared war (1514) against Shah Ismail of Persia, whom he defeated at Caldeiron. In the following year he overran Armenia. He conquered Egypt and incorporated it with the Turkish empire. The Ottoman sultan also became the chief of Islam, as the representative of Mohammed, and the sacred cities of Mecca and Medina, along with the chief Arabian tribes, in consequence acknowledged his supremacy.

Selim II. (1524-74), son of Suleiman I. and Roxelana, b. at Constantinople. He succeeded his father in 1566, and, being entirely devoid of military virtues, left all power to his ministers and generals, while he gave himself up to debauchery. In this reign Arabia was conquered (1570) and Cyprus (1571), but the Turkish fleet

was destroyed off Lepanto the same year by Don John of Austria.

Selim III. (1761-1808), b. at Constantinople, succeeded in 1789, and, as soon as he was able, prosecuted many reforms, which, as a result of the opposition aroused amongst the janissaries, eventually cost him his life.

See J. H. Kramers, 'Selim I., II., and III.' (in *Enzyklopädie des Islam*, 1926).

Selimnia, see SLIVEN.

Selincourt, Ernest de (1870-1943), Brit. literary historian, b. at Streatham, and educated at Dulwich College and Univ. College, Oxford. He was successively lecturer in modern Eng. literature, Oxford Univ., 1899-1909; prof. of Eng. language and literature, Birmingham Univ., 1908-1935; and vice-principal there from 1931 to 1935; dean of the faculty of arts, Birmingham Univ., 1919-30; prof. of poetry, Oxford Univ., 1929-33; and president of the Eng. Association, 1935-36. He wrote a number of critical eds. of Brit. poets, including *Lectures on Wordsworth* (1935); *Letters of William and Dorothy Wordsworth* (1935); and a work on Keats.

Selinus, one of the most important ant. tns. in Sicily, situated upon a hill on the S.W. coast, and upon a riv. of the same name. It was founded by the Dorians from Megara. It lay on the E. coast of Sicily, 628 B.C. It soon attained great prosperity, but it was taken by the Carthaginians in 409, when most of its inhab. were slain or sold as slaves, and the greater part of the city destroyed.

Seljuks, name of sev. Turkish dynasties, descended from the Ghuz chieftain Seljuk, which reigned over large parts of Asia in the eleventh, twelfth, and thirteenth centuries. Toghrul Beg, the grandson of Seljuk, conquered Persia, and having captured Merv (1040) made it the official cap. He was succeeded in 1063 by his nephew Alp Arslan, who took Syria and Palestine from the Fatimite caliph of Egypt, and in 1071 defeated and captured the Byzantine emperor Romanus Diogenes, who thereupon ceded a large part of Asia Minor. Alp Arslan was succeeded by his son Malik Shah in 1072, on whose death in 1092 the empire was divided among four branches of the Seljukian family, the prin. dynasty ruling in Persia, while the others were centred at Kerman, Damascus, and Iconium. Of these the last was of longest duration, but it was superseded at the end of the thirteenth century by the Ottomans. See M. T. Houtsma, *Histoire des Seldjoukides*, 1903; and H. Glück, *Die Kunst der Seldschuken in Kleinasien und Armenien*, 1923.

Selkirk, Alexander (1676-1721), Scottish sailor, b. at Largo, Fifeshire, first going to sea in 1695, sailed in 1704 with Thomas Stradling, who, quarrelling with him, landed him on the uninhabited is. of Juan Fernandez, from which he was rescued after five years by Capt. Woodes Rogers, R.N., afterwards governor of the Bahamas. S.'s adventures inspired Defoe with the idea of *Robinson Crusoe*, the scene of which story, however, is laid in Tobago, and Cowper's poem *Alexander Selkirk*. See life by J. Howell, 1829.

Selkirk, Thomas Douglas, fifth Earl of (1771-1820), b. at St. Mary's Isle, Kirkcudbrightshire, the seat of the Douglas family, was educated at Edinburgh Univ., where he became a friend of Walter Scott. His life was mainly concerned with the welfare of Scottish and Irish emigrants to Canada. In 1803 he founded a settlement in Prince Edward Is., and in 1811 he became a large owner of stock in the Hudson's Bay Company. The following year he formed a settlement of Highland Scots and Irish on the banks of the Red R. Here his work was embittered by the hostility of the Northwest Company, a most influential company, and a rival of the Hudson's Bay Company. See also RED RIVER OF THE NORTH. See C. Martin, *Lord Selkirk's Work in Canada*, Oxford Historical Studies (vol. vii.), 1916.

Selkirk: 1. Cap. of Selkirkshire, Scotland, and a royal burgh, lies on the r. b. of the Ettrick, 38 m. S.S.E. of Edinburgh. Its inhab. are mainly engaged in the manuf. of tweeds. Pop. 6000. 2. Tn. of Canada, in Manitoba prov., 20 m. N.E. of Winnipeg, near Lake Winnipeg. Industries include lumbering, rolling mills, and a steel foundry, and it is a centre of the fishing industry. Pop. 5000.

Selkirk Mountains, range in Brit. Columbia, distinct from the Rocky system, which is bounded by the Columbia R. on the E., W., and N. Mt. Dawson (11,100 ft.) is the highest peak, and there are others over 10,000 ft. high. Roger's Pass in the range is crossed by the Canadian Pacific Railway.

Selkirkshire, co. of Scotland, bounded W. and N. by Peeblesshire, S. by Dumfriesshire, E. and S. by Roxburghshire, and N.E. by Midlothian. It is 20 m. long and 10 m. broad, with an area of 267 sq. m. and a pop. of 22,800. The surface is hilly, Broad Law (2751 ft.) being the highest point. It is watered by the Tweed, Ettrick, Yarrow, and the Gala. The chief tns. are Selkirk (the cap.) and Galashiels. It was formerly called Ettrick Forest, and it contains the vales of Yarrow and Ettrick, which have formed the subject of much poetry and prose, and shared in border hist. On its hilly pastureland many thousands of sheep are reared. The main industry is the manuf. of tweeds in Galashiels and Selkirk. Subsidiary industries include skin works, engineering, silk, and paper processing. The co. is rich in architectural antiquities, and contains ruins of the castles of Oakwood, Buccleuch, Dryhope, Newark, and Tynelaw. At Philiphaugh on Yarrow Water Montrose was defeated by David Leslie in 1645. In Ettrick churchyard lie the remains of Hogg, the Scottish 'shepherd' poet. Mungo Park was born at Foulshiels. Sir Walter Scott lived at Ashiestel (or Ashiestel) for seven years. The combined cos. of S. and Roxburgh send one member to the House of Commons. See T. Craig-Brown, *History of Selkirkshire* (2 vols.), 1886; Hall, *History of Galashiels*, 1884; Sir G. Douglas, *The Border Counties*, 1899; and A. and J. Lang, *Highways and Byways on the Border*, 1913.

Sellafield, hamlet of W. Cumberland, England, 5 m. S.S.E. of Egremont. Near by is an early Bronze Age stone circle. Here in 1949 the construction of the first Brit. atomic energy plant was commenced. The neighbouring vil. of Calderbridge has a ruined abbey. Both S. and Calderbridge are in the par. of St. Bridget (pop. 660).

Selle, riv. in France, rising near Le Cateau, and flowing N. to join the Scheldt. It was the scene of a battle in Oct. 1918, when Anglo-Fr. troops gained a considerable victory over a numerically superior Ger. force; 20,000 prisoners were taken, together with 475 guns.

Selma, co. seat of Dallas co., Alabama, U.S.A., on the Alabama R., 165 m. by rail N.N.E. of Mobile. Dairy and stock farming are carried on, and cotton-seed oil produced. There is a Negro univ. Pop. 19,800.

Selous, Frederick Courteney (1851-1917), Brit. big-game hunter and traveller, was b. in London and educated at Rugby and in Germany. He landed in Africa at the age of twenty, and from that time followed his bent as a hunter and a field naturalist. He will remain as the great authority on the lion. The prin. field of his activities in natural hist. was Rhodesia. In 1893 he saw active service against the Matabele. In spite of his age he was accepted for service in the 1914-18 war. In the operations at Tanga he was awarded the D.S.O., but was killed on Jan. 4, 1917, at Kissaki, being buried where he fell. His books include *A Hunter's Wanderings in Africa* (1881); *Sunshine and Storm in Rhodesia* (1896); *Sport and Travel East and West* (1900); *African Nature Notes and Reminiscences* (1908). See life by J. G. Millais, 1915.

Selsey, or Selsea, fishing vil., 9 m. S. of Chichester, in Sussex, England. The bishopric of the S. Saxons, founded here in the seventh century, was in 1079 removed to Chichester, and the sea has washed away the site of the old cathedral. The headland S. Bill is at the end of the peninsula. Pop. 3700.

Seltzer Water, obtained naturally from springs near Limburg in Wiesbaden, Germany. It is made artificially, however, by mixing its chief ingredients, viz. the bicarbonates of sodium, calcium, and magnesium, and the sulphate of potassium, with water, and aerating with carbon dioxide. It has valuable medicinal properties, especially for those suffering from liver complaints, and it is also extensively used as a table water.

Selvas (Sp., forests), almost impenetrable forests in the basin of the It. Amazon. The name has been extended to other regions, and may be said to embrace the dense evergreen forests which in the Americas occupy the equatorial regions of constant rain, and appear further N. over a part of Central America and the Caribbean, and further S. on the coast of Brazil.

Selwyn, George Augustus (1809-78), Eng. bishop, b. at Hampstead, London, was educated at Eton and St. John's College, Cambridge. He was ordained in 1833, and in 1841 went to New Zealand as

first bishop, and greatly influenced the development of the colonial church. He attended the Pan-Anglican synod in England in 1868, and the same year accepted the see of Lichfield. Selwyn College, Cambridge, was erected in his honour in 1882. See lives by H. W. Tucker, 1879, and G. H. Curteis, 1889.

Selymbria, or Selivria, important tn. of ant. Greece on the Propontis. It was founded by the Megurians in Thrace about 670 B.C., and continued to flourish until it was conquered by Philip II. of Macedon. The site is now occupied by the tn. of Silivri.

Semantics (Gk. *σημαντικός*, significant), or **Semasiology**, that part of the science of linguistics which treats of the meaning of words, as distinct from phonetics, which is concerned with their sounds. S. also studies the hist. of words with regard to changes in the notional content of their meanings, i.e. the sense-changes. This study is very important for etymology and lexicography. The later meaning of a word often represents an extension, restriction, or specialisation of the primary meaning, or else could be otherwise logically related to it. In addition, there are many sense-changes, which cannot be classified by the historical method.

G. Stern has suggested seven main classes for the semantic changes: (1) *substitution*: sense changes due to external, non-linguistic causes; e.g. the bookkeeping-office, from the practice of looking one's name for a couch, is now used for the place where tickets are sold; (2) *analogy*, e.g. exposition, used in the sense of exhibition, under influence of Fr. *exposition*; (3) *shortening*, e.g. bus, for omnibus, private, for private soldier, pram for perambulator; (4) *nomination*: a name is intentionally transferred to a common noun, e.g. basque, champagne, angora cat, jersey; (5) *regular transfer*, e.g. leaves, to indicate thin objects resembling a leaf in shape; bed, e.g. for the foundation of a steam engine; (6) *permutation*, e.g. front, back, top, of an object; gallery, pit, boxes, in a theatre; (7) *adacquation*, e.g. horn, used for a musical instrument; astonish, literally to thunder-strike; rubric, connected with Lat. *ruber*, red, which originally indicated a heading of a chapter or section written or printed in red. Most of these sense changes, which are normal phases of the linguistic development, are the result of the striving of speakers to adjust speech yet more closely to the functions which it has to perform.

See M. D. Whitney, *The Life and Growth of Language*, 1872; M. Bréal, *Semantics*, 1900; W. Wundt, *Die Sprache*, 1900, 1911; H. Bradley, *The Making of English*, 1919; E. Weekley, *The Romance of Words*, 4th ed., 1922; G. Ogden and I. A. Richards, *The Meaning of Meaning*, 1923; G. Stern, *Meaning and Change of Meaning*, 1932; and J. Jespersen, *Linguistics*, 1933.

Semaphore. Originally an instrument for signalling messages by means of disks and shutters in a framework, but now applied to all methods of communicating by the code which grew out of it. Invented by Edgeworth in 1767. It was first

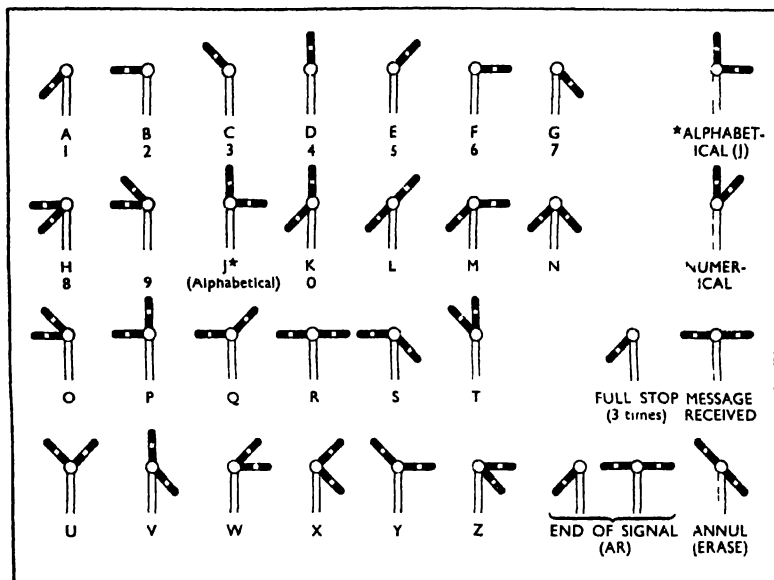
adapted by Chappe in 1794 for use between Paris and the frontier armies. In the following year a further adaptation, introduced by Sir G. Murray, was accepted by the Brit. Admiralty for communication between London and Portsmouth, the instruments being placed on church towers, high hills, etc., at distances up to 10 m. apart. With the aid of a telescope they were very efficient in fine weather and lasted until superseded by the electric telegraph (see TELEGRAPHY) about seventy years later. In 1816 the Brit. Admiralty adopted Sir H. Popham's S. for sea service, but this was replaced by Pasley's in

rounding dist. yielding coffee, pepper, indigo, rice, tobacco, sugar, etc. Petroleum also is found. A railway connects S. with Surakarta, whence lines run to Surabaya and the E., and via Jokjakarta (q.v.), on the S. to Batavia in the W. In the post-war Nationalist rising of 1945 Dukatus landed at S. with detachments of Punjabi machine gunners to liberate Dutch women and children internees (Pop. 217,700 (Europeans 20,000).

Semasiology, see SEMANTICS.

Semelography, see under SHORTHAND.

Semibreve, largest musical note-value now in current use, and therefore called



THE SEMAPHORE ALPHABET

1827. But a considerable period elapsed before they were brought into general use for the R.N., and it was not until 1890 that the method was extended to the actual spelling of words, and the present system evolved whereby the relative positions of two arms, human or mechanical, indicate different letters or numerals. All shore signal stations and most warships are fitted with the mechanical two-arm S., but the system has never been much used in the army where Morse ("flag wagging") has been more popular.

Semarang, cap. of a former residency of the same name (pop. 2,021,000), lies at about the middle of the N. coast, 250 m. E. of Batavia, central Java, at the mouth of the S. R. It is, however, by canal, which like the riv. requires constant dredging, that it communicates with the sea. It is the seat of a court of justice, and centre of exploitation of the Javan forests, the sur-

rounding dist. yielding coffee, pepper, indigo, rice, tobacco, sugar, etc. Petroleum also is found. A railway connects S. with Surakarta, whence lines run to Surabaya and the E., and via Jokjakarta (q.v.), on the S. to Batavia in the W. In the post-war Nationalist rising of 1945 Dukatus landed at S. with detachments of Punjabi machine gunners to liberate Dutch women and children internees (Pop. 217,700 (Europeans 20,000).

Seminole, tribe of N. Amer. Indians of Muskogean stock, which is centred chiefly in Oklahoma. The Seminole war (1835-42) was caused by their refusal to cede their lands in Florida and to move to Arkansas. S., like those of the other Five Civilised Tribes, no longer live on reservations.

Semipalatinsk: 1. Formerly a prov. of the steppes of Russia, but now a region of the Kazakh S.S.R. It is rich in minerals, especially chromium and nickel. A road known as the Eastern Ring, 300 m. long, passes across the most important agric. and industrial areas of S. and the E. Kazakh Region and so links up with the Altai ore dist., with its great deposits of lead, copper, and gold. 2. The chief tn.

of the region of S.; lies on the Irtysh and is situated at the point where the Turksib Railway crosses the navigable part of the riv., and in the heart of steppe land of considerable agric. value. It is linked by rail, via Karaganda, with Azhezkazgan (with ore deposits) and Balkonour (coal mines), so that the newly developed Karaganda industrial region has become a focal point for transport from W. Siberia and the Urals. It is an important *entrepôt* of the U.S.S.R. for commerce from Dzungaria to Omsk, etc., and has silk mills and a large meat-packing plant. Pop. 109,700.

Semi-Pelagianism, see PELAGIUS.



SEMIQUAVERS



QUAVERS

Semiquaver, note in music equivalent in value to half a quaver and a sixteenth of a semibreve.

Semiramis and Ninus, her husband, the mythical founders of the Assyrian Empire of Ninus or Nineveh. The legendary hist. of S. may have been borrowed from E. (Median) sources; and some writers have identified her with the Syrian goddess Astarte, the goddess of love and fertility.

'Semiramis of the North', see MARGARET, queen of Denmark, Norway, and Sweden.

Semiryecheusk, formerly a prov. of Russian Turkestan; the greater part of it now forms the Kirghiz S.S.R. The old prov. had an area of 144,550 sq. m., and was bounded on the N. by Semipalatinsk, on the E. and S. by China, and on the W. by the Russian provs. of Ferghana, Syr-Darya, and Akmolinsk. N. and S. respectively of Lake Issyk-kul are the ramifications of the Ala-tau and Tian-shan mt. systems, both of which rise to a height of 16,000 ft. The Ili (250 m.) flows to Lake Balkash in the S., and other noteworthy rivs. are the Chu and Naryn. The fertile prairies of Sergiopol in the N.E. contrast with the barren steppes S. of Lake Balkash. Cattle-breeding is the prin. occupation of the nomad Kirghiz (q.v.), but cereal crops are cultivated with success by the Russians.

Semites, name derived from the biblical table of nations (Gen. x. 21ff.), and used primarily, but not accurately, to denote the group of nations there described as descended from Shem. The term is first used by A. L. Schlözer in 'Von den Chaldäern', in J. G. Eichhorn's *Repertorium* (1781), but the credit of its invention is claimed by Eichhorn himself in his *Allgemeine Bibliothek* (1794). Later researches made it clear that the word Semite must lose its literal sense and adopt a conventional one, for the genealogies given in Gen. x. apparently were planned on lines that were neither primarily ethnological nor primarily linguistic, but mainly cultural-political spheres. For instance, Canaan (the eponymous ancestor

of the Canaanites, who spoke a language strictly related to Heb.) is not considered as a son of Shem, but of Ham (Gen. x. 6). Nowadays the term Semite is primarily linguistic (see SEMITIC-HAMITIC LANGUAGES).

There has been much disputation as to where the origin of the S. must be sought. Some scholars suggested Kurdistan, 'the land of Arpachshad,' an 'ancestor of Abraham' (Gen. x. 22), but this theory has been abandoned. E. Renan, L. Lenormant, F. Hommel, J. P. Peters, and especially L. Guidi, favoured Mesopotamia as the motherland of the S. A large group of scholars adhere to the Arabian theory, according to which the S. came originally from central Arabia. According to A. T. Clay, A. Moret, G. Contenau, and other scholars the anct. Amurru (probably situated in N. Syria) was the original home of the S. T. Noldeke, G. A. Barton, and others would trace the origin of the S., as well as that of the Hamites (see under SEMITIC-HAMITIC LANGUAGES), to Africa. The solution of this problem is even more complicated by the fact nowadays recognised by serious scholars that there is an affinity between the Hamitic and Semitic languages. The most striking analogy is in the roots. In Semitic languages roots are mainly trilateral, and the same peculiarity seems to appear in the Hamitic tongues; many other points of resemblance might be noted.

According to W. F. Albright, possibly about 8000 B.C. the Mesolithic Age of Palestine, or Natufian, makes its appearance from the N., and a later phase of it penetrated into Egypt. These Natufians were food-producers as well as food-gatherers, and Prof. Albright suggests that they were the ancestral Semito-Hamitic stock, which had not yet become sharply differentiated. The S. were dolichocephalic. The three great universal religions, Judaism, Christianity, and Islam, have sprung from them. This fact alone would suffice to give them a pre-eminent position in the hist. of mankind. See LINGUISTIC FAMILIES; PALESTINE, *Archaeology*.

Semitic-Hamitic Languages. Until recently it was assumed that these two groups were autonomous linguistic families, but nowadays all competent philologists agree that they formed originally one family. The Hamitic branch included anct. Egyptian and its descendant, the Coptic language, the Berber or Libyan dialects of N. Africa, and the various Cushitic tongues of modern Abyssinia and the adjacent regions. It may also have included Hausa, mainly spoken in the Sudan, but very important as a kind of *lingua franca* in a great part of N. Central Africa. Egyptian, being nearer Semitic, both chronologically and geographically, resembles the Semitic languages more closely than do the other Hamitic tongues.

The Semitic languages are grouped in various ways, the following being the most generally accepted: (1) N.E. Semitic or Aracadian (consisting of Assyrian and Babylonian, see under CUNEIFORM

WRITING), now extinct; (2) W. Semitic or N.W. Semitic, comprising Heb. (see under HEBREW LANGUAGE AND LITERATURE) and the extinct allied languages (Moabite, Edomite, and Ammonite), Canaanite, and Phœnician (including Punic, which was spoken by the ant. Carthaginians), both extinct, and Aramaic (including the Aramaic portions of the Bible and the language of the Babylonian Talmud, see under HEBREW LANGUAGE AND LITERATURE), with its descendant, the Syrian tongue, still spoken by some 100,000 people, and employed for liturgical purposes by the Syriac Church; (3) S. Semitic, subdivided into N. Arabic (including the extinct Nabatean and many other dialects) or Arabic proper, spoken by about 60,000,000 people, and S. Arabic, comprising the extinct languages spoken in S. Arabia, Minnan, Sabæan, Himyaritic, and Hadhramautic, as well as Old Ethiopic (the ancestor of Ge'ez, the liturgical language of the Abyssinian Church), Amharic, Tigré, and Tigrai or Tigrina. See also under LINGUISTIC FAMILIES; SEMITES. See C. Brockelmann, *Grundriss der vergleichenden Grammatik der semitischen Sprachen*, I, 1908; II, 1913; De Lacy O'Leary, *Comparative Grammar of the Semitic Languages*, 1923; M. Cohen, 'Langues et civilisations antiques,' in *Langues du monde*, 1921; L. H. Gray, *Introduction to Semite Comparative Linguistics*, 1931; G. A. Barton, *Semitic and Hamitic Origins*, 1931; and H. Fleisch, *Introduction à l'étude des langues sémitiques*, 1947.

Semler, Johann Salomo (1725-91), Ger. biblical critic, became principal of the theological faculty of Halle in 1757. He is sometimes called 'the father of German rationalism.' In that he questioned the divine origin of the Bible, rejected the Apocalypse, and tried to explain away prophecies and miracles, he was indeed a pioneer among Ger. rationalists. Yet he believed sincerely in revelation, and has with some justice been accused of intellectual inconsistency. His huge literary output is now mostly consigned to oblivion. See lives by H. Hoffmann, 1905, and P. Gastrow, 1905.

Semliki, riv. of Central Africa, discovered by H. M. Stanley in 1888. Issuing from the N. end of Lake Edward, it flows with a N.E. course into the S. end of Lake Albert.

Semlin, or **Zemun**, tn. of Slavonia, Yugoslavia, and an important *entrepôt* for commerce in cereals, cattle, etc., situated on the Danube, 6 m. N.W. of Belgrade. Hunyadi Janos d. here in 1456, and the ruins of his castle still stand. Pop. 28,100.

Semmering, name of a mt. (1577 ft.), and a pass over it, in the Alps, between Austria and Styria. Between 1818 and 1854 a railway was carried across the pass (3225 ft.) by means of a tunnel (4692 ft. long), some 300 ft. below its summit. See J. Solch, *Die Landschaft des Semmerings*, 1818.

Semnonnes, ant. Ger. people who claimed to be the chief of the tribes of the Suavi. They dwelt in the region of the middle Elbe.

Semois, riv. of Belgium, 120 m. long,

passing with a winding course through picturesque woodland scenery. It rises near Arlon in the S.E. corner of the country and flows W. through the provs. of Luxembourg and Namur to fall into the Meuse above Monthermé in France. Tobacco is largely cultivated in its valley. Bouillon with its famous castle is situated on the riv.

Semolina, food consisting of wheat granules. The name is especially applied to grains too coarse to pass through the sieve of the bolting machine, or too hard to be ground into flour.

Sempach, tn. on the E. shore of Lake S., 9 m. by rail N.W. of Lucerne, in the canton of Lucerne, Switzerland. Here, in 1386, the confederated Swiss, inspired, it is said, by the prodigies of valour of Winkelried, defeated the Austrians under Leopold, their duke. Pop. 1229.

Sempervivum, see HOUSELEEK.

Sempill, name of four Scottish ballad writers of Renfrewshire.

Robert S. (c. 1530-95) was perhaps an illegitimate offspring of the noble family of S. (or Semple). He wrote *The Siege of the Castel of Edinburgh* (1573), in which he probably took part, and a coarse poem entitled *The Reqnitis Tragedie* (1570).

Sir James S. (1566-1626), grandson of Robert, third Lord S. (d. 1572), who was first a partisan and then an opponent of Mary Queen of Scots. He satirised the Rom. Catholic Church in his lusty *Packman's Pater Noster*.

Robert S. (c. 1595-c. 1665), son of the above. A Royalist, he has left a picture of his times in his ballad on *The Life and Death of Habbie Simson, Piper of Kilbarchan*.

Francis S. (c. 1616-82), son of the above. He wrote the *Banishment of Poverty*, and probably had a hand in the popular poems *Maggie Lauder* and *She raise and let me in*.

See T. G. Stevenson (ed.), *The Sempill Ballades*, 1872.

Sempronius, daughter of Tiberius Gracchus, who was censor in 169 B.C., and sister of the two celebrated tribunes. She married Scipio Africanus Minor, and after his death was suspected by some persons of having murdered him.

Sen, Jap. copper coin, of the value of a hundredth part of the yen. Its nominal value is about a farthing.

Senaar, see SENNAH.

Senac de Meilhan, Gabriel (1736-1803), Fr. author, b. in Paris, son of Jean Baptiste S., physician to Louis XV. He purchased the mastership of requests in 1761 and was intendant of Aunis, 1766, Provence, 1773, and Hautaut, 1775. Made intendant-general for war, 1776, he was soon dismissed. Author of the fictitious *Memoires d'Anne de Gonzague, princesse palatine* (1786). Against Necker, he pub. *Considérations sur les richesses et le luxe* (1787). *Considérations sur l'esprit et les mœurs* appeared in 1787. Leaving France in 1790, he lived in London and Aix-la-Chapelle. S. went to Russia in 1792, by invitation of Catherine II., but displeased her; pensioned off, he went to Hamburg, thence to Vienna. His works include a

good novel, *L'Émyré* (1793), and *Du gouvernement, des mœurs, et des conditions en France avant la révolution* (1795).

Senanayake, Dudley Stephen (b. 1882), Sinhalese agriculturist and councillor. A landowner, and former planter, he was for fifteen years minister of agriculture and lands and a member of the state council. In this capacity, before Ceylon achieved her present dominion status, S. did much to improve the is.'s agric. economy and was responsible for the development of colonisation schemes for the peasants and for important irrigation schemes. In 1919 he had been in politics for over thirty years and was first elected a member of the Legislative Council under the crown colony system of government prior to the Donoughmore reforms. As leader of the Ceylon State Council he played a distinguished part in organising Ceylon's war effort, which was of great value to the allied cause. When Ceylon became a dominion, in 1947, S. became Prime Minister and minister for foreign affairs and defence.

Senate, or Senatus, 'an assembly of elders' (*senes*). As long as Rome only comprehended one tribe, the Latins of the city on the Palatine, the senate consisted of only 100 members. After the accession of a second tribe, the number was raised to 200; and, when a third tribe joined, to 300 by Tarquinius Priscus. Under the last king, Tarquinius Superbus, the number of senators was diminished, but was made up after his expulsion by the addition of the prin. plebeians of the equestrian order. The new senators were called *conscripti*, or 'co-enrolled,' in contradistinction to the patrician senators or *patres* (fathers); and the whole S. was styled *patres conscripti*, which is *patres et conscripti*. The dictator Sulla increased the number to 600; and Caesar raised it to 900. Augustus reduced it again to 600. During the latter part of the republic the age of admission into the S. was probably twenty-six, for a man might be elected *questor* at the age of twenty-five, and a *questor* was admissible into the S. after the expiration of his year of office. After the estab. of the censorship the election of persons into the S. was in the hands of the censors. All curule magistrates, that is, consuls, praetors, curule aediles, and censors, had by virtue of their office a seat in the S., and might speak. Vacancies in the S. were filled up at every *lustrum* (an interval of five years), and it was only on this occasion that the censors might elect those ex-magistrates into the S. whose conduct was unblemished. Hence we have to distinguish between two kinds of senators, real senators (*senatores*), and such as were allowed 'discreet sentiment in senatu' (Festus, *Senatores*). The plebeians obtained access to the S. through the various magistracies, as they were successively opened to them. At last even the *tribuni plebis* became, by the possession of the office, full members of the S. Down to the end of the republic the S. of Rome partook more or less of the character of a body representing the people: it was, as Dionysius says, the head and soul

of the whole republic, or the concentrated intelligence and wisdom of the whole nation.

In modern times the term is used to designate the 'upper house' in the bicameral polity of various countries, e.g. Franco, the U.S.A., some of the Australian states, Canada, and Eire. It is also the title of the governing body in many univs.

Sendabad, see SANDABAD.

Sendai, tn. of Honshin, Japan, in the prov. of Iukuzen. It has the largest market for N. Japan, and the prin. trade is salt and fish. Manufs. have been developed. There is a univ. Pop. 219,500.

Seneca: 1. *Marcus* (or *Lucius*) *Annaeus Seneca* (c. 55 B.C.-c. A.D. 40), the rhetorician, b. at Corduba. He was a member of



SENECA

Bust from Herculaneum in the National Museum, Naples

the equestrian class and spent his time in Rome and Spain. He wrote a work on rhetoric (ten books on *Controversia*, of which we have five, and at least two on *Suasorie*, of which we have one) and a hist. of Rome, now lost, from the beginning of the civil wars almost down to his own death. Eds.: A. Kiessling, 1872, and H. Bornecque, 1902. 2. *Lucius Annaeus Seneca* (c. 4 B.C.-A.D. 65), statesman and philosopher, was also b. at Corduba and brought to Rome at an early age. He devoted himself to the study of rhetoric and philosophy, and soon gained a reputation at the Bar. He was, however, banished in A.D. 41 by Claudius, but recalled in 49 by the influence of Agrippina and made tutor to her son Domitius, afterwards the Emperor Nero. He was also Agrippina's chief adviser, and when Nero came to the throne his power still further increased, and he shared the administration of affairs with Burrhus, the praetorian prefect. But S.'s presence soon

became irksome to Nero, and his enormous wealth excited his cupidity, with the result that after the conspiracy of Piso in 65 he was compelled to commit suicide. S.'s fame rests upon his writings, which have been subject to various criticisms, but all agree that they are characterised by clear and forcible language. Among them are *Quæstionum Naturalium Libri septem* (trans. by John Clarke, 1910), which treat of meteorology and astronomy; ten *Dialogues*; three books *On Clemency*, dedicated to Nero; seven *On Benefits*; twenty books of *Letters to Lucilius* (selection by W. C. Summers, 1910); a satire on the death of Claudius; and nine tasteless tragedies: *Hercules Furens*, *Thyestes*, *Phœnissæ*, *Phædra*, *Œdipus*, *Troades*, *Medea*, *Agamemnon*, *Hercules Oëtus* (*Oëtaria*, which deals with Nero's ill-treatment of his wife, is spurious), on Gk. mythological subjects and written in iambic senarii, interspersed with choral parts in anapaestic and other metres. There is an ed. by F. Haase, 1896. For other eds. see J. W. Basore, *Moral Essays* (with trans.), 1928-35; F. S. Miller, *Tragedies* (with trans.), 1917; R. M. Gummere, *Letters* (with trans.), 1917; and monograph by F. C. Holland, 1920. See also S. Dill, *Roman Society from Nero to Marcus Aurelius*, 1904; J. W. Cunliffe, *Early English Classical Tragedies*, 1912; and F. L. Lucas, *Seneca and Elizabethan Tragedy*, 1922.

Seneca Falls, tn. of New York, U.S.A., in Seneca co., on the Seneca R., 26 m. S.W. of Syracuse. The tn. is named after the riv., which here drops 50 ft. There are manufs. of sev. types of machinery. Pop. 7000.

Seneca Lake, lake of New York, U.S.A., drained by S. R.

Senecas, N. Amer. Indians of the Iroquois stock, now in three reservations. They number about 3000, plus 1000 in Oklahoma.

Senefelder, Aloys (1771-1831), Austrian inventor of lithography, b. at Praguc, the son of an actor. He was for a time an actor, but was unsuccessful, and eventually took up printing, inventing lithography (q.v.) about 1796. See life by C. Wagner, 1914.

Senega, or **Rattlesnake Root**, dry woody root of *Polygala senega*, a N. Amer. plant, used by the N. Amer. Indians as a cure for rattlesnake bites. It is also employed in the treatment of bronchial troubles.

Senegal, riv. of W. Africa, formed by the junction of the Bafing and the Bakhoj, which flows into the Atlantic Ocean. It has a total length of 590 m., and is navigable for 430 m. The chief trib. is the Faleme.

Senegal, Fr. colony on the W. coast of Africa, situated S. of the Senegal R. It is bounded by the Atlantic and Gambia on the W., Mauritania on the N. and E., Fr. Sudan on the E., and Fr. and Portuguese Guinea on the S. The colony was reorganised in 1920 and 1925. The chief tns. are St. Louis (founded in 1658, pop. 51,000), the cap.; Dakar, a fortified naval base, to which was joined in 1929 the small is. of Gorée; Kaolack (30,000); Diourbel

(13,000); Thiès (24,000), and Ziguinchor (10,000). Area 77,730 sq. m. Pop. 1,895,000. The prin. tribes are the Wolofs, who number about 600,000, and are mostly Muslims, and Mandingos. Millet, maize, ground-nuts, rice, gum, rubber, and castor-beans are raised, and the industries include brick-making, pottery, and weaving. Oil production from ground-nuts rose to 60,200 tons in 1917. Salt production is being developed. Titanium-bearing sand and zircon are produced. Senegal is represented in the National Assembly by two deputies, and by three delegates each in the Council of the Republic and the Assembly of the Fr. Union. It is administered in eleven 'circles.'

Jean de Béthencourt in the fourteenth century coasted along Senegal, but made no settlements there. By the end of the sixteenth century the F. had acquired rights at the Île de Gorée, which Richelieu recognised when he granted the monopoly of the traffic in Senegal and Gambia to the first trading company chartered by France. In the seventeenth century Gorée was taken by the Dutch, but soon retaken by d'Estree, and it remained Fr. until the treaty of Nimwegen. The Brit. dislodged the Fr. and the latter did not return to Senegal until 1677. At this time a new trading company headed by André Brue began to exploit Senegal, and Brue sailed up the riv. in search of the ter. of the Niger. The Fr. were, however, driven out again in 1720, but the Seven Years war returned Gorée to France though it deprived her of Senegal and St. Louis. St. Louis was recaptured during the Amer. war of Independence, and Gorée, the Cape, and Gambia formed a new colony, 'Senegal and its dependencies,' under one gov., and in 1783 the treaty of Paris confirmed France in these possessions. But the African policy of the revolution caused France to abandon all her trading posts. Between 1815 and 1848, after the restitution of Senegal, France again became interested in her African possessions, which within a century were to constitute the colony of Fr. W. Africa. René Caillé in 1821 penetrated into the rolling hinterland of Senegal on his famous journey to Timbuctoo. For some time the Fr. Gov. neglected Senegal, fearing objections from England, but eventually Faidherbe, one of the greater names in Fr. colonial hist., was assigned to Senegal, and landed there in 1852. After pacifying the country, then in the throes of the waning slave trade, he initiated a programme for the education of the Negroes and for public works, including the creation of a cap. and the reclamation of unexploited regions. In 1854 he was appointed governor of the colony, a post which he might have won earlier but for his republican past. Later he founded Dakar (q.v.), since Gorée was then no longer sufficient to Fr. needs. See A. C. Sabatier, *Le Sénégal*, 1926.

Senegal, Upper, and Niger, Fr. colony of W. Africa, the name of which was changed in 1920 to the Fr. Sudan. See SUDAN, FRENCH.

Senegambia, term for the region between

the Rs. Senegal and Gambia on the W. coast of Africa, now fallen into disuse.

Seneschal, chief of the five great officers of state at the Fr. court in the eleventh, twelfth, and thirteenth centuries, and the second person in the kingdom. He was commander-in-chief of the military forces, steward of the king's household, and presided in the king's court in his absence. The corresponding Eng. functionary was the lord high steward.

Senggora, Singgora, Singora (Malay *Sawang Klar*), or Songkla, port of Siam, on the E. coast of the Malay peninsula. It is an important administrative centre, and is served by good roads. It has railway connection with Bangkok and Singapore, and has a wireless station. There is tin-mining in the interior. Pop. 10,000.

Senigallia, or Sinigaglia, city and episcopal see of Italy on the Adriatic in the prov. of Ancona. It was a settlement of the Gallic tribe of Senones (q.v.). In 82 B.C. Pompey destroyed the Rom. colony which had been estab. c. 280 B.C. S. was formerly noted for its fair which dated from 1200, and has a Gothic castle. Fishing is the chief industry. Pop. (estimated) 31,500. See C. Jellocci, *Fauna Senigallia*, 1931.

Senility, weakened condition characteristic of old age. The most potent cause of the decrease of functional activity is the diminished elasticity of the coats of the arteries. The blood moves more sluggishly and the capillaries are insufficiently supplied, so that the tissues are not properly nourished. Fatty and calcareous degeneration of certain parts set in and the effect is seen in loss of muscular power, diminished nervous control, slow reactions to stimuli, and general feebleness. The brain is apt to suffer with other organs, and there is likely to be loss of mental activity, loss of memory, and, occasionally, senile dementia. Senilism is a term used to indicate a premature condition of S.; it is usually due to excessive stimulation in youth, hereditary influences, as syphilis, etc.

Senior, Nassau William (1790-1864), Eng. economist, b. at Compton, Berkshire, was educated at Eton and Oxford. In 1826 he was made prof. of economics at Oxford. He sat on sev. important gov. commissions in connection with the poor laws. As a result of the findings of these commissions with which S. was connected, the gov. passed the Poor Law Amendment Act of 1834. Among his works are *An Outline of the Service of Political Economy* (1836); *Historical and Philosophical Essays* (1805); and *Conversations with Distinguished People* (1880). See S. L. Levy, *Senior's Industrial Efficiency and Social Economy*, 1928, and M. Bowley, *Nassau Senior and Classical Economics*, 1937.

Senlao, Battle of, see HASTINGS, BATTLE OF.

Senlis, tn. of France in the dept. of Oise on the Nonette. An anct. tn., it has remains of a Rom. amphitheatre as well as Gallo-Rom. ramparts, and its cathedral of Notre-Dame was begun in 1155. It is an agric. market and has manufs. of bricks and tiles, cardboard, and yard measures. Pop. 7200.

Senna, drug obtained from the leaves or fruits of various species of *Cassia*, a genus of leguminous plants. The S. of pharmacy and commerce may be either the leaves or fruits (pods), i.e. either S. leaves or S. pods. There are two prin. varieties of pods and leaves, Alexandrian S. pods and leaves from *C. acutifolia*, grown in Egypt, and Tinnevely S. pods and leaves from *C. angustifolia*, grown in South India and Arabia. Either pods or leaves are used by making an infusion in warm or cold water. Another species of *Cassia*, *C. fistula*, gives a brown sugary pulp from the ripe fruits, containing more or less the same constituents, and was used in concoction of S. (*Brit. Pharmacopœia*, 1914), but this differs in shape from S. S. is a valuable cathartic or purgative, the aperient action being due to the constituents emodin and chrysophanic acid.



SENNÆ

Sennacherib, king of Assyria, 705-681 B.C. On his accession he had practically to reconquer his kingdom from Morodach Baladan. He afterwards captured all the cities in Phœnicia except Tyre, and all the cities in Judæa except Jerusalem. After sev. campaigns against Babylonia he was assassinated by two of his sons, Sharezer and Adrammelech. See S. Smith, *First Campaign of Sennacherib*, 1921; D. D. Luckenbill, *Annals of Sennacherib*, 1924; and W. Rudolph, *Sennacherib in Palastina*, 1929.

Sennar, S.E. prov. and tn. of the Anglo-Egyptian Sudan. The tn. is on the Blue Nile, and is connected by rail with Khartoum, Wad-Medani, Kordofan, Port Sudan via Kassala, and El Obeid. The Makwar dam was built here (1921-25) to impound the flood waters of the Blue Nile, and irrigate 3,000,000 ac. of fertile land. It also serves the valuable purpose of a railway bridge across the Blue Nile.

It was within a century and a half of the consolidation (A.D. 1504) of their power by the Fung dynasty, a negroid race of mixed Abyssinian and Arab origin, that

S. became a centre of African civilisation. This dynasty endured until the time of Mehmet Ali, whose son, Ismail, sent to deal with the Fung kingdom, soon reduced S. (1822). In the time of Gordon, S., with Khartoum and Gallabat, was among the last places to hold out against the Mahdi's followers; but S. fell in Aug. 1885. For three years the Brit. Gov. was content to see that the frontier was held by the Egyptian Army; but in 1898 a stronger effort was made and S., together with Rosetres, was occupied by Maj.-Gen. Hunter. Area 38,700 sq. m. Pop. (prov.) 160,000; (tn.) 8000.

Senones, people of central Gaul, around the upper Seine, who revolted against Caesar (51-52 B.C.). Their chief tn. was Agedincum, the modern Sens. A branch of these, dwelling in Cisalpine Gaul between the Adriatic and the Apennines, were conquered by the Romans under Dolabella in 283 B.C., and expelled from their lands.

Senonian, see CHETACROUS SYSTEM.

Sens, tn. of France in the dept. of Yonne on an is. in the lt. Yonne. It has a Gothic cathedral, that of St. Etienne, begun in 1140, and manufs. agric. implements, boots and shoes, chemicals, and cutlery. There are also flour-mills and tanneries, and trade is based on wine, grain, wood, coal, and wool. Pop. 17,300.

Sensation and Sensationalism, in metaphysic, means variously (a) mental consciousness of the processes of physiological sensation; (b) subjective experience, as of pleasure or pain arising from objective experience (see the article SUBJECT AND SUBJECTIVE); (c) in positive philosophy, denotes that form of sensibility which belongs to the organs of sense. Sensation is to be differentiated from perception, which means the reception of knowledge (as distinct from ideas or images) through the senses, but is used by some philosophers, e.g. Descartes, Locke, Leibniz, and others, with a very extended significance. Reid uses the word perception to include the element of sensation, but others, like Hamilton, use sensation as including perception in the special or limited sense in which Reid uses the latter word, namely the faculty acquisitive of knowledge of the external world.

In the doctrine of Berkeley (q.v.), which marks an epoch in the growth of empiricism, the point from which we start in knowledge would seem to be a mass of unrelated ideas, i.e. sensations, and thence by means of experience to their higher interpretation. But he himself came gradually to lay more emphasis on the intellectual framework of experience and less on the side of sensations, and admitted that 'strictly the sense knows nothing.' It was, however, left to Hume to carry out to their logical issue the consequences of experience and sensation, or, in other words, the consequences of the attempt to base experience on a mere chain of isolated sensations; and the clear perception of the logical outcome of experience as formulated by Hume was the starting-point from which Kant (q.v.) evolved his critical

philosophy. In relation to sensation, Kant's criticism was that sensations were not the sole reality, and that there must be certain relating activities of the mind which are themselves feelings (q.v.) to work upon the material of sense, before ever the feelings can be known and form a true experience (see also KNOWLEDGE; PSYCHOLOGY). In physiology sensation is the peculiar property of the nervous system in a state of activity, by which impressions are conveyed to the brain or sensorium. See further BRAIN; NERVOUS SYSTEM.

Sensitiveness in Plants, see IRRITABILITY. **Sensorium**, term which was once used by philosophers to indicate the seat of the soul, or the centre of sensation, which was supposed to be some point in the brain. See NERVOUS SYSTEM.

Sensory Paralysis, see under PARALYSIS. **Senta**, see ZENTA.

Senusert, or **Sen-usret**, see SEROSTRIN.

Senussi, name of a N. African *tarika* or minor Muslim sect, which was founded by Mohammed ben Ali El S., an Algerian by birth. The founder originally belonged to the Maliki, one of the four *mezahs* or orthodox sects of the Muslim world, but did not altogether agree with its recognised leaders. The S., under his influence, rose to considerable importance; and before the First World War it was estimated that the followers of the Sheikh El S. numbered some 3,000,000, who were scattered over the whole of N. Africa, and were especially numerous in Wadal, and fairly numerous in Egypt.

There is a practical as well as a religious side to the S. movement. As long ago as 1894 Weld Blundell described the whole movement as 'a very large, well-organised, slave-owning and slave-dealing corporation, managed by the heads of the brotherhood, with local branches . . . in all parts of N. Africa. . . .'

Driven out of their native land by the It.s. after the First World War when Mussolini was 'colonising' his African Empire, the S. were scattered over the other Moslem countries of the Middle E., many of them in Egypt. After Libya was freed, sev. members of the family of Sayed Mohammed Idris el S. came back to their country after an exile of twenty years, returning as guests of the Brit. Army. Members of the S. had served as guides with the Long Range Desert Group (q.v.). See F. R. Wingate, *Mahdism and the Egyptian Sudan*, 1891; Earl of Cromer, *Modern Egypt*, 1908; Rosita Forbes, *The Secret of the Sahara: Kufara*, 1921; and E. K. Evans-Pritchard, *The Sanusi of Cyrenaica*, 1949. See also CYRENAICA.

Seoni, chief tn. of S. dist. in the Jubbulpore div. of the Central Provs., India, 73 m. N.E. of Nagpur. Pulses, wheat, hemp, and rice are the main crops. Pop. 14,000. The dist. has an area of 3206 sq. m. and a pop. of 395,000.

Seoul, also **Keijo**, cap. of Korea, on the Han R. over 70 m. from its mouth. It is a walled city, 12 m. in circumference, with crooked and dirty streets and dreary open spaces. The chief building is the royal

palace, but it boasts a Rom. Catholic cathedral and a pagoda. It has a univ. with 600 students. The chief pursuits of the inhab., who are estimated at 937,000, are the manuf. of tobacco, silk, mats, and fans. Its port is Chemulpo, 25 m. away, with which it is connected by rail.

Sepal, see CALYX.

Separate Estate, see under HUSBAND AND WIFE.

Separation, see JUDICIAL SEPARATION.

Separator, see under DAIRY.

Sephardim, see ASHKENAZ.

Sepharvaim, or **Sippar**, city of Mesopotamia, on the Euphrates, now represented by Abuhabba. In the cuneiform inscriptions two portions of the city are distinguished, 'Sippar of Shamash' and 'Sippar of Anunit,' which were respectively the centres of the worship of those divinities. The temple of Shamash, the sun-god, was discovered in 1881 by Hormuzd Rassam (*q.v.*).

Sepia, brown pigment used as a water colour. It is prepared from the colouring matter secreted from the ink bags of some species of cuttlefish (*q.v.*) to obscure its movements by colouring the water. The pigment is prepared by dissolving the dried contents of the bags in dilute ammonia or soda solution, and reprecipitating with hydrochloric acid. Because of the evenness with which it can be easily spread on paper with a brush, it is much used in painting monochromes.

Sepoy, native soldier in India as distinct from the European soldiers, in the former Brit. Army in India. The native regiments had Indians for non-commissioned officers. The term is still used to distinguish the infantry soldier from the trooper, or sowar. They formed the nucleus of the E. India Company's army in the fighting against the Fr., having been raised in the mid-eighteenth century. See also SPAH.

Sept, group of related persons claiming descent from a common ancestor, and owning one chief. The term was common in early Ireland. The Scots S. is a branch of the clan.

Septaria, or **Septarian Nodules**, concretionary masses of clay or marl. They are generally aggregated round some organic nucleus, such as a tooth or leaf, and shrink during solidification. These shrinkage cracks are filled up with calcite and present curious divs., from which arises the name S. (Lat. *septum*, a partition). Found in the Lias, London Clay, etc., varying in size from a few inches up to sev. feet in diameter.

September, ninth month, as the year is now divided by W. nations. It consists of thirty days. The old Rom. year commenced in March; S. was then the seventh month, as is implied in the name, which has been retained.

Septembrists, perpetrators of the massacres which took place in September 1792 in Paris. The victims were royalists and constitutionalists confined in prison, and the massacres were undertaken by the com. of Paris in consternation at the approach of the Prussians, whose avowed object was to restore the king.

Septennial Act, Act of Parliament passed in 1716 which enacted that 'the then parliament should continue for seven years.' It repealed the Triennial Act in force since the reign of Charles I. In consequence of the allegation that 'a popish faction were designing to renew the rebellion in this kingdom, and the report of an invasion from abroad,' the above Act was passed. It continued in force until the 1911 Parliament Act fixed the duration of Parliament at five years.

Septet, musical term for any work, or number in a work, written in seven parts for voices or instruments.

Septicæmia, infective disease characterised by the presence of bacteria in the blood. The organisms most frequently associated with the infection are *Streptococcus pyogenes* and *Staphylococcus pyogenes*, but it often occurs that many different organisms are present. The condition follows a wound or injury which has been allowed to disseminate infection. The pus-forming organisms are carried away in the blood-stream, and although the bactericidal action of the blood is usually sufficient to prevent them multiplying *en route*, there is danger of secondary supuration if they effect a lodgment in any tissue. The usual indications of septicæmia are reddening and swelling of the parts adjacent to the wound, enlargement of the lymphatic glands, and a general feverish condition. The wound itself should be treated antiseptically, and every effort should be made to strengthen the body by nourishing food to enable it to withstand the toxic effect of the organisms. Quinine is often the most useful tonic. Inoculation may be resorted to; a univalent serum may or may not be effective, according to the nature of the infection. In doubtful cases, a polyvalent serum should be tried.

Septimarus, see SIMANCAS.

Septimer Pass (7582 ft.) in the Alps, leading from Milan, having the same route as the Splügen Pass as far as Chiavenna, after which it goes E. up the Val Bregaglia, then N. into the Rhine valley by Oberhalbstein and the Albula valley.

Septuagesima, the Sunday before Sexagesima; in the eccles. calendar, the third Sunday before Lent, being about the seventieth day before Easter.

Septuagint, The (Lat. *septuaginta*, 'seventy'), also known as LXX, the most ant. trans. of the Heb. Scriptures, is so called from the account of its origin first given in a little Gk. work known as *The Letter of Aristeas*, and repeated by Josephus (*Antiq.* xii. 2) and Eusebius (*Præpar. Evang.* liii. 2-5). According to this Ptolemy II. Philadelphus (283-246 B.C.), when he had founded his great library at Alexandria, was anxious to have a copy of the Heb. Scriptures. He sent a delegation to the high priest Eleazar in Jerusalem asking for a copy of the law and for men able to translate it. Seventy-two elders, six out of each tribe, were sent for this work, and the trans. of the law into Gk. was completed by them in seventy-two days. It is uncertain why out of seventy-two arose the term S. There may have

been a popular association with the Heb. *seventy elders* (Exod. xxiv. 1, 9), or the number was simply rounded off. Until recently the *Letter of Aristeus* was considered spurious, but some eminent scholars believe that, while many of its details are fictitious, the 'quintessence' of the account is historical. The trans. of the various books vary considerably in accuracy and style. The book of Esther, the Psalms, and the prophets appear to have been trans. between 180 and 170 B.C. and in a very inferior manner. The Christians from the beginning adopted the S.; in the Gk. Church it is still used, while in the Lat. Church it was replaced in the fifth century by St. Jerome's Lat. trans., the Vulgate. Already in the second century it was trans. into Lat. (the old Lat. version of the Bible); in the next century into Coptic; in the fourth and fifth centuries into Gothic, Armenian, Georgian, and Ethiopic; c. 700 into Arabic, and c. 900 into Old Slavonic. Various trans. from the Heb. Bible (Syriac, Gk., Vulgate) were considerably influenced by the S. After the Christians adopted the S. after their own, the Jews discarded it. See H. M. Orlinsky, *The Septuagint*, 1949.

Sepulchral Mound, see BARROW and CAIRN.

Sepulchr, *church of the Holy*, stands in the N.W. corner of the old part of Jerusalem, and contains the tomb of Christ. Many monasteries, chapels, and other eccles. buildings hide it from view, leaving only the S. façade open. The church was originally a number of separate churches, built from time to time on the holy sites in and after the fourth century. It received its present form in the time of the crusades, when one large Romanesque church was built by the crusaders. In 1799 a great part of the church was rebuilt, only to be almost entirely destroyed by fire in 1808, another comprehensive building appearing in 1810. This, the present structure, is notable for two conspicuous domes, the larger or westerly surmounting the rotunda and the sepulchre itself, being built of iron lattice girders under Russian auspices in 1808; the other or E. dome goes back to the crusading period (having escaped destruction in 1808), and is said to be the largest dome of its type in Palestine. It had to be taken down after the earthquake of 1927. The church is of outstanding interest, apart from its sanctity in the eyes of a large part of mankind, from the fact that it is shared by representatives of most of the churches of Christendom. Orthodox, Rom. Catholic, Armenians, Jacobites, Copts, and Abyssinians have their appointed chapels and rights within the walls (formerly, Nestorians and Gregorians had the same privileges), and in it is celebrated practically every form of Christian liturgy and ritual. During Holy Week and at the other great festivals of the Christian year it presents a spectacle of diverse ceremonial paralleled in no other building in the world.

In the early nineteenth-thirties the state of the building gave rise to anxiety over the possibilities of collapse, and a

Brit. architect, Wm. Harvey, conducted a survey. His report showed, *inter alia*, that the decay in the structure was in the main due to the thrusts from the dome of the Katholikon forcing outwards all the exterior walls and in many cases the walls of subsidiary surrounding structures. After this report was made, grants from the Rockefeller Foundation enabled much repair work to be undertaken, and it would seem that the probability of collapse has been greatly diminished. The church was damaged in the fighting in Jerusalem in 1947-48, and by a serious fire in 1949.

Sepulchre, Knights of the, were an order first sanctioned, it seems, by Pope Paschal I. in 1113. Their purpose was to protect the burial-place of Christ and to befriend pilgrims. Pope Innocent III. united them to the Knights Hospitallers, but Alexander VI. restored their independent status. When the Ottomans regained possession of Jerusalem the knights left Palestine and settled in Perugia (Italy).

Sepulveda, Juan Ginés de (1490-1574), Sp. historian, b. near Cordova. He was historiographer to Charles V., and preceptor of the future Philip II. His works include lists of Charles V. and Philip II., a life of Albornoz, and a hist. of Spain in the New World, all of which are written in Lat.

Sequani, powerful Celtic people in Gallia Belgica, living chiefly in the area between the Saône and the Rhône. Vesontio, the modern Besançon, was their chief tn. Ariovistus (*q.v.*) occupied part of their ter., and on his defeat in 58 B.C. by Caesar the S. passed under Rom. domination.

Séquard, see BROWN-SEQUARD, CHARLES EDWARD.

Sequences, in music, device whereby a melodic figure is repeated rising, or more rarely falling, by a degree of the scale, at least twice in succession. It is called S. only in cases where the composition retains the same key throughout, regardless of changes in the intervals; where the key changes with each step up and down the scale, so that all the intervals remain the same, the technical term is not S. but *rosalia*.

In the Rom. ritual S. denotes a rhythmic or metrical phrase said or sung after the Alleluia that precedes the gospel. When the Rom. missal was revised in the sixteenth century only four of the existing S. were retained: *Ultima Paschali*, for Easter; *Veni, Sancti Spiritus*, for Pentecost; *Lauda Sion*, for Corpus Christi; and *Dies Irae*, for masses of the dead. The *Stabat Mater*, for the feast of the Seven Dolours, is of later date.

Sequestration (Lat. *sequestrare*, to remove, lay aside). A writ of S. is a process of execution (*q.v.*) under the Rules of the Supreme Court. Where any person has been ordered to pay money into court or do any other act within a limited time, and, after due service of the judgment or other order directing him to do so, fails to obey the same, the aggrieved party may, at the expiration of the time limited for compliance, issue a writ of S. against the

property of the disobedient party. This writ, which is obtainable without any further order of court, is directed to four sequestrators (who are not necessarily professional persons, but any persons chosen by the aggrieved party) and gives them authority to enter the lands of the disobedient person and get into their hands not only the rents and profits of the real estate, but also all goods, chattels, and personal estate, and to detain the same under S. until the person in default has cleared his contempt. All moneys that come into the hands of the sequestrators may be applied by them to meet the demand of the aggrieved party; but they must get the leave of the court before they sell any of the goods and chattels sequestered, and the proceeds of such sale will be dealt with only as the court may direct. Any judgment or order against a corporation wilfully disobeyed may, by leave of a judge, be enforced by S. against the corporate property as an alternative to attachment of the directors or S. against their private property. An injunction against a peer, M.P., or other privileged person may be enforced by S. Again, inasmuch as eccles. property may not theoretically be touched by lay hands, a judgment creditor, whose his debtor is a beneficed clerk, may send a writ of S. (called a *sequestrari facias de bonis ecclesiasticis*) to the bishop of the diocese commanding the latter to enter the benefice and sequester the same until the judgment debt be paid out of the tithes, rent, and profits.

Sequestrectomy, in surgery, the removal of dead bone fragments to promote healing.

Sequin, Venetian gold coin in use from 1280 to the fall of the Venetian republic. It was worth about 9s., and bore on one side a figure of St. Mark blessing the banner of the republic, and on the other a figure of Christ. The term is now applied to small disks of celluloid, etc., used as trimming for ladies' dresses.

Sequoia, genus of gigantic evergreen coniferous trees, natives of California, where they attain a height of upwards of 300 ft., and the trunk a diameter of about 25 ft.; they may be 2500 to 3000 years old. *S. gigantea*, the Wellingtonia, or mammoth tree, has a spire-like habit of growth, the lower branches drooping, and the upper ones ascending. In Britain it rarely exceeds 100 ft. in height. *S. sempervirens*, the redwood, is a very valuable timber tree. It grows rapidly in Britain in moist, well-drained soils, and has been recommended for culture. Its deep colour and yew-like form give it a very handsome appearance.

Sequoyah, see under CHEROKEES.

Sérac, see under GLACIERS.

Seraglio, name given to the anct. residence of the sultan at Constantinople. It is beautifully situated and of great size, and contains gov. buildings, mosques, gardens, and other fine edifices, the chief being the harém. The term is now generally used as a synonym for harém or a suite of women's apartments.

Seraing, tn. of Belgium, and industrial

suburb of Liège, situated on the Meuse, 4 m. S.W. of the city. It has coal-mines and is the seat of the important Cockerill works, founded in 1817, comprising blast furnaces, smelting-houses, foundries, steel-works, and engineering shops. The famous crystal-works of Val-Saint-Lambert are also situated in this tn. Pop. 42,200.

Serajevo, see SARAJEVO.

Serampur (Saharanpur), tn. in the Hugli dist. of W. Bengal, India, on the r. b. of the Hugli R., 13 m. N. of Calcutta. It was originally a Dan. settlement purchased by Great Britain in 1845. It is the home of the Baptist mission. There are large jute mills. Pop. 55,300.

Serang, see CRRAM.

Serapeum, see under SERAPIS.

Seraphim (plural of Heb. *sārāph*), order of angelic beings mentioned in Isaiah vi. 2-6. Theirs is the duty of ministering before God's throne in heaven and continually proclaiming His glory.

Seraphine, keyed musical instrument, now obsolete, which preceded the harmonium.

Serapis, or **Sarapis**, Egyptian divinity, whose worship was introduced into Greece in the time of the Ptolemies. His cult was introduced into Rome together with that of Isis. He was specially worshipped as a god of healing. He had a most magnificent temple at Alexandria, the Serapeum. See O. Weinreich, *Neue Urkunden zur Serapis-Religion*, 1919, and A. Erman, *Die Religion der Ägypter*, 1934.

Serbia, or **Servia**, former kingdom of the Balkan Peninsula. The area of S. at its original estab. as a kingdom by the treaty of Berlin, July 13, 1878, was some 18,700 sq. m. The augmented kingdom, by the treaty of Bucharest (Aug. 10, 1913), which ended the second Balkan war, was approximately 36,000 sq. m. After the revolution in Austria-Hungary (Croatia, Slovenia, Dalmatia, Bosnia, and Herzegovina) declared their independence of Austria and their union with S., which, together with Montenegro, became merged in the new kingdom of the Serbs, Croats, and Slovenes, proclaimed Dec. 1, 1918. In 1929 the old divisional names were abolished, and the kingdom was reconstituted under the name of Yugoslavia (*Yug.* south), under the rule of the Serbian dynasty. S. is now the name of a federal unit of Yugoslavia, and has an area of 31,000 sq. m., and a pop., with Vojvodina, Kosovo (Kosovo), and Metohia (Metohija), of 6,523,200; S. itself having 1,131,400.

The former kingdom was bounded N. by the Danube and Save, which separated it from Austria-Hungary, and by Rumania, E. by Bulgaria, S. by Greece, W. by Montenegro and the autonomous state of Albania. Its N. part lies entirely in the basin of the Danube, which riv. is joined by the Save, and afterwards by the Morava, which crosses the centre of the pre-Balkan-war ter. from S. to N., receiving numerous affluents; the tribs. of the W. or I. b. of the Morava have their source in an offshoot of the Dinaric Alps, which divide the waters of the Morava from those of the Drina; the

tribes of the E. bank of the Morava come from the Bulgarian Mts., which are offshoots of the Balkan range. S. is a country of mts. and valleys, in great part covered with anct. forests. Its mts. are of no great height, averaging no more than 1500 ft. The four great mt. systems of the Balkan peninsula, the Dinaric, Balkans, Carpathians, and Rhodopes, meet and intermingle in S., so that the Serbian mts. are varied both as to formation and to structure. S. has many kinds of wild animals and birds: deer, chamois, hares, bears, wolves, wild boars, lynxes, foxes, and wild cats, bustards, quail, pigeon, snipe, wild geese, woodcock, vultures, eagles, falcons, ravens, swans, etc. The climate is continental, and marked by great extremes. The Dinaric Alps are a barrier to the warm winds from the S. and S.W., and the clearing of forests in many dists. has enhanced the severity of the climate.

S. is predominantly a pastoral and agric. country, the soil is fertile and rich in minerals, for the most part unworked, and there are extensive fields of maize. Up to about 1890 it had no manufs. other than those of the coarsest kind, consisting of fabrics wrought by peasants for their own domestic wants. Barley is widely cultivated, being used mainly as a cattle food, and in the manuf. of beer. Among commercial plants are flax, hemp, and tobacco, while the cultivation of sugar-beet was introduced in 1900 with happy results. There is also a good fruit-growing industry, Serbian prunes being notable in foreign markets. The grape-vine flourishes in Kragina, Zupa, Niš (Nish), Jellien, and other dists., Negotin being a particularly good wine. Manufs. are increasing, flour-mills are developing, and the sugar industry, cheese-making, and meat-packing are moving forward. There is cotton- and flax-weaving at Belgrade, where great quantities of cloth, sail-cloth, etc., are produced; and a large factory at Sigitse, worked by electricity, for the production of fine cotton and linen cloth. Copper ore is worked at Bor, the 1939 output being 987,000 metric tons. There are chrome-mines in the S. region, particularly near Skopje, 11,850 metric tons being produced in 1939. In the W. at Podrinje 18,960 tons of antimony were produced from two mines.

S. was an hereditary constitutional monarchy, and the constitution, adopted by Yugoslavia, gave to S. representative and parl. gov., based on a wide democratic foundation with all guarantees, both for the constitutional rights of the citizens and for the estab. of national representation. The legislative power of the state was vested in the king and the Skupština, the executive, being in the hands of a ministerial cabinet appointed and, in theory, dismissed by the king, but in practice retaining office only so long as it enjoyed the confidence of the Skupština.

The majority of the Serbs belong to the Orthodox Gk. Church, but a large number, especially in Bosnia, are Muslims. Socially the salient characteristic of S. is its communal organisation.

History.—The Serbs, a Slav race from the prov. of Galicia, settled in the Balkan peninsula in the seventh century in the ters, known as Bosnia, Herzegovina, Dalmatia, S., Montenegro, Banat, and Macedonia. In the early part of the ninth century the Serbian tribes were a mere bone of contention between the Franks and the Bulgars, but endeavoured unsuccessfully, by subjecting themselves to the Byzantine suzerainty, to secure their independence as the state of Rascia. The Byzantine or Grecian dominion ended in the twelfth century when the dynasty of Stephen Nemanya (1169-1372) began.



Yugoslav Embassy

A WOMAN OF EASTERN SERBIA

After 1372 the empire, from the lack of homogeneity in its peoples, became involved in the contest between the Serbian Church, which had secured its autonomy early in the thirteenth century, and the patriarchate of Constantinople, and with the Turkish invasion began the period of its decline. The long struggle for political independence bore no fruit until the Napoleonic wars, especially after the Austrian defeat at Austerlitz, and the consequent rivalry of France as a claimant with Russia and Austria for Balkan ter. In 1829 the Russo-Turkish treaty of Edirne, while recognising Turkish suzerainty in S., guaranteed a Russian protectorate in certain spheres. In 1830 the sultan conferred the dignity of hereditary prince on Miloš Obrenovic, the leader of the administrative officials of the Serbian rebels, but the chief obstacle to Serbian independence was now the aversion of the Tsar Nicholas I. of Russia to a Serbian constitution.

The position of Prince Miloš became untenable in 1839 when, as a result of the Porte's forced acceptance of Russia's suggestion, a legislative council composed of his enemies was forced upon him, and he resigned. In 1842 Alexander Karađorđević (son of Karađorđe) was elected by the Serbian National Parliament as prince of S. to guard the constitution, and indeed, to reign more under an oligarchy in sympathy with and under the domination of the Porte. By the treaty of Paris (1856), following the Crimean war, Russia lost the protectorship of S., and it was further provided that although the existing Ottoman garrison rights in Belgrade and other places should be maintained by the treaty, it should be with the important restriction that there should be no armed intervention in S. without the preliminary consent of the high contracting powers. This restriction put S. on the road to complete political emancipation.

In the Russo-Turkish war of 1877 S. co-operated with Russia, and her troops advanced on Constantinople. At the peace of San Stefano S. did not gain all she was entitled to by virtue of her conquests, but at the Congress of Berlin, when the peace was revised, the independence of S. was at last formally recognised, though S. ceded Bosnia and Herzegovina to Austria as the price of Austrian influence on her behalf. King Milan, the first monarch of independent S., despairing of gov. either with or in conflict with the new Radical groups, abdicated (1889) in favour of his son, the ill-fated Alexander, a minor. With his abdication was introduced the parl. system, and with that system began the era of many cabinet crises. But in 1893 King Alexander had declared himself of age, and exhibited his reactionary impulses. The discontent excited by the imprisonment of the Radical leaders after the attempted assassination of the ex-King Milan was aggravated by the latter's marriage, contrary to the wishes of all the friends of the old Obrenović dynasty, with Madame Machin (Draga), a woman by whom it was impossible that the king could have issue. The result of these events, coupled with the disorganised state of the national finances, was a conspiracy to exterminate the Obrenović dynasty, culminating on the night of May 28 in the murder of the king, Queen Draga, the queen's brothers, the Prime Minister, and others, and the proclamation of Peter Karađorđević as King Peter I. of S.

These events gave a new impulse to Pan-Slavism, and caused a coalition of the various political parties in S. In March 1912 S. and Bulgaria, by signing a treaty of alliance, took the first ominous step in the direction of the final quadruple alliance or Balkan League which led to the Balkan war of 1912-13 (for the part taken by S. in this war see *under* BALKAN WAR, and consult 'Balkanica', *Les Serbes et les Bulgares dans la guerre balkanique*, 1913). The insatiable ambition of King Ferdinand involved Bulgaria in difficulties with Rumania after the close of the war and the conclusion of the peace conference in London; and in the summer

of 1913 S. and the other allies were leagued in a fierce war against their former ally, Bulgaria, over the disposal of the spoils of war from Turkey. As a result of the second war against Bulgaria, S. won all she claimed, and in addition acquired even the old Turkish vilayet of Kossovo which previously she had been content to leave to Bulgaria. The effect of the treaty of peace signed at Bucharest on Aug. 10, 1913, was that the E. frontiers of S. remained as they were so far as Bosnia, Austria-Hungary, and Rumania were concerned; while the Serbo-Bulgarian frontier, starting from Mt. Partarika, followed the former frontier into Macedonia and then ran between the Vardar and Struma Rts. to Mt. Belasitza. Starting from the Montenegrin side the altered Serbian frontier now was to the W. of Djakovc, including Priština and Lake Ochrida. S. thus regained Old S., and the important tn. of Skopje (formerly Üskub), together with a great portion of Macedonia. The pop. was increased by 1,500,000, including some Albanians and Macedonian Slavs.

S. needed a period of peace, but on June 28, 1914, the Austrian archduke, Franz Ferdinand, was assassinated at Sarajevo, and on July 28 Austria-Hungary declared war on S. The Serbian Army under the command of Gen. Putnik was not highly trained, and ammunition was scarce. By the end of 1915, despite an heroic resistance, they had been forced to abandon S. and retired to Corfu. Later, a reconstituted army, 120,000 strong, under the command of Gen. Boyevic, who succeeded Putnik, then crossed to Salonika to help in the allied operations there. S. itself was divided by its conquerors, Bulgaria being allotted all Serbian Macedonia, much of Old S., and nearly half of S. proper. In Oct. 1918 the Serbs returned to their own country. The Serbian ambition was directed towards a Greater S., but the Croats would only co-operate on a basis of federation. Radić, leader of the peasant party in the Croat Parliament at Zagreb, declared for union, as also did a Slovene National Council convened at Ljubljana in Aug. 1918. A United National Council was estab. at Zagreb, not at first recognised by the Serbs, who were, however, occupying former Austrian ter. However, in the interests of the Croat National Council, the Serbian Army occupied Fiume, but withdrew to avoid a clash with Italy. On Dec. 21, 1918, the first gov. of a united Yugoslavia was set up with Protić, a Serbian Radical, as Premier, and Trumbić as foreign minister. Since this date the fortunes of S. were merged in the kingdom of the Serbs, Croats, and Slovenes, or Yugoslavia (*q.v.*). Following the defeat of Italy and Germany in the Second World War S. (with the Vojvodina, Kosovo, and Metohija) became a federative unit of the Federal People's Republic of Yugoslavia, with a pop. of 6,523,200. See L. von Ranke, *History of Serbia* (Eng. trans., 1847); H. W. V. Tompkinson, *History of Serbia*, 1917; L. F. Waring, *Serbia*, 1917; R. G. D. Laffan, *The Serbs—The Guardians of the Gate*, 1918; D. A. Wray, *The Geology and*

Mineral Resources of the Serb-Croat-Slovene State, 1921; J. Buchan (ed.), *Yugoslavia*, 1923; R. W. Seton-Watson, *Sarajevo*, 1925; A. Mousset, *Le Royaume Serbe*, 1926; G. Ellison, *Yugoslavia, Country and People*, 1933; and R. M. French, *Serbian Church Life*, 1942.

Serbo-Croat Language and Literature.—The Serbian language belongs to the southern branch of the Slavonic languages and is closely allied to Croatian and to Slovenian, with this difference, that the Serbs employ the Cyrillic alphabet and the Croats and Slovenes the Lat. alphabet. Despite differences of dialect and vocabulary, the Serbian and Croatian languages may be considered as one Serbo-Croatian language. The introduction of the Cyrillic alphabet is accredited to St. Cyril, who converted the Serbs in the ninth century, from which time, with the trans. of the Scriptures, southern Slav literature begins. Slovene literature goes back in existing fragments to the tenth century, Serbo-Croatian to the fourteenth century. In the Middle Ages Serbian literature was comprehensive owing to the contact with Byzantine civilisation and to the opportunity afforded within the many Serbian monasteries for the trans. of the popular medieval romances. The best original literature of this time is found in the biographies and annals of Serbian saints and kings. With the advance of Ottoman domination Serbo-Croat culture was confined to Ragusa, where, especially evidenced in the works of Menčetić and Zlatarić, and the epic poet, Gundulić, author of *Osman*, the Renaissance flourished. Its influence was prevalent, especially reflected in the plays of Držić, the contemporary of Shakespeare. The eighteenth century was a period of decline, but whereas hitherto the Serbs and Croats had developed intensely nationalistic literatures along independent lines, by the end of the eighteenth century unification began to set in, advocated by the Serbian writers (Obradović and Karadžić, the Croatian Gaj), and the Slovenes Vraz and Bleiweis. Obradović was a rationalistic scholar, the first to advocate the intellectual unity of the southern Slavs. He died in 1811, and his work was furthered in the nineteenth century by Karadžić, whose ambition was to give to the Serbs a uniform national language. The greatest poets of this time were the Serbian Njegoš, and the Croat Mazuranić. Poets of a later generation who may be mentioned are Rodićević, Preradović, and Askero, these having managed to bring Serbian national tendencies into line with W. influences. In S. the best work has continued to be found in poetry and the short story. In fiction Russian and Fr. influences have predominated, and the Serbo-Croat novel is mainly realistic.

The chief glory of Serbo-Croat literature, however, is the folk-poetry, which in the eighteenth century was the inspiration of sev. It. poets. This folk-poetry is also hall-marked by the very high praise of Goethe. In England a vol. of folk-poems was trans. by Sir John Bowring (*Serbian Popular Poetry*, 1827), and *Serbski Pesme*

or *National Songs of Serbia* by 'Owen Meredith' (Lord Lytton), appeared in 1821. Later collections are G. It. Noyes and L. Bacon (trans.), *The Heroic Ballads of Serbia*, 1913; and D. H. Low, *The Ballads of Marco Kraljević*, 1921.

See also D. R. Moxhill, *Grammar of Serbian Language*, 1887; P. Popović, *Literature of the Southern Slavs*, 1917; D. R. Sabotić and N. Forbes, *Serbian Grammar*, 1918; M. S. Stanojević, *Early Yugoslav Literature*, 1922; G. Geseman, *Serbo-Croatian Literature*, 1930; and D. Frv, *Serbo-Croat Phonetic Reader*, 1939.

Serbian art flourished in the twelfth to fourteenth centuries, and reflected the political divs. of the period. In the twelfth century it consisted in great part of frescoes. Serbian art of to-day follows the trends of the rest of Europe, and architecture takes precedence over painting. The Serbian National Romantic School is represented by Mestrovic. In music the outstanding features are the rhythmic folk-dances and the epic ballads. Among modern composers one of the foremost was Miroje Mirojević (1884–1943), who founded the Society for Chamber Music (Collegium Musicum), and the chair of musical science in the Belgrade conservatory.

Serein, mist or exceedingly fine rain which falls from a cloudless sky. The phenomenon is not unusual in tropical climates. Since the speed of fall of the average raindrop is no more than 10 m.p.h., and the difference between the speed of the rain-producing cloud and the winds beneath may be two or three times that, if the rain has to fall a considerable distance from an isolated cloud, it will appear to fall from a clear sky. Indeed, the cloud may have precipitated all its moisture and disappeared completely by the time the rain reaches the ground.

Serena, La, see COQUINBO.

Serenade (It. *serenata*), title of a musical composition resembling a light symphony, particularly associated with Haydn and Mozart. It was originally applied to a love-song played by a gallant outside his lady's window at night.

Serer, natives of Senegal, Fr. W. Africa, chiefly to be found between the Salum-Gambia watershed and Cape Verde. Nature-worship is common, though many are nominally Mohammedan. Of Negroid stock, marked Mandingo characteristics are to be found in the ruling families.

Seres, or **Siros**, see SERRES.

Seres, inhab. of the ant. Serica, a country in the extreme E. of Asia, famous as the native region of the silkworm, which was also called *serp*; and hence the adjective *sericus* for 'silken,' and the word *sericulture*.

Sereth: 1. Trib. of the Danube, rises in the Carpathians in Bukovina, and flows S.S.E. through Moldavia to join the Danube 5 m. W. of Galatz, after a course of 290 m. Its chief affluents are the Suczava, Moldava, Trotus, and Dniat. The Red A. crossed the S. early in 1944 in their invasion of Rumania. See EASTERN FRONT IN SECOND WORLD WAR. 2. Trib. of the Dniester in Galicia, 124 m. long.

Seretse (Khama) (b. 1921), grandson of Khama III. (for fifty years ruler of the Bamangwato tribe of Bechuanaland), only surviving son of Sekgoma II. (d. 1925), and heir to the chieftainship of the Bamangwato. He was educated at Fort Haro, S. Africa, and Balliol College, Oxford (1945), and pursued legal studies in London. During his minority a council of regency administered tribal affairs in 1925-26, but in 1926 Tshekedi, son of Khama III., was installed as regent. In Sept. 1943 S. notified his uncle, Tshekedi, that he proposed to marry Ruth Williams, an Englishwoman, stating that he feared that Tshekedi and the tribe would not approve of his match. They did not; but despite their opposition S. was married to Ruth Williams (Sept. 29, 1948). At the first tribal meeting after S. had been summoned to Serowe by the tribal leaders to explain his action there was an almost unanimous condemnation of the marriage. The tribe, in effect, resolved to prevent S.'s wife from entering the Bamangwato Reserve. The subsequent meetings (or *kgotlas*), however, showed the increasing anxiety felt by the tribe that, if S. were not allowed to return, Tshekedi, whose rule had recently become unpopular, would become permanent chief, an event they meant to prevent at all costs. In June 1949, when S. returned to the reserve, a tribal meeting gave a decisive majority in favour of S. as chief with his European wife. The immediate consequence of this was that Tshekedi left the reserve accompanied by five out of eight of the chief's representatives, i.e. leading members appointed to preside over the administrative dists. of the reserve, and, challenging the validity of the *kgotla's* decision, demanded a judicial inquiry on the question of the recognition of S. Tshekedi and his supporters did not dispute S.'s claims to the succession; what they impugned was his suitability to hold the chieftainship while married to a white woman. On the recommendation of the Brit. commissioner a judicial inquiry into the question of recognition was held under a proclamation of 1943 which provides that, on the occurrence of a vacancy to the chieftainship, the succession shall be designated by tribal assembly according to native custom. Once such inquiry is held it becomes necessary for the United Kingdom Gov. to make the final decision. The inquiry, it appears (the report was not published), unanimously decided against the recognition of S. as chief and in favour of the exclusion of both S. and Tshekedi from the reserve. The gov. gave three reasons for their consequent order to exile S. from his people and fatherland: (i.) to prevent the disruption of the tribe; (2) because of doubts whether S. would discharge with success the responsibilities of the chieftainship; and (iii.) because of doubts whether S. could retain adequate tribal support. In effect the gov. decided that by contracting the marriage without prior consultation and against the advice of the tribal authorities S. showed himself to be unmindful of the interests of his tribe and of

his public duty, and there were doubts whether S. could in the circumstances retain as chief the support of a tribe which had been inclined to factions and feuds and in which an opposition would certainly arise which would question his authority once it was certain that Tshekedi's regency was at an end. The gov. stated that no representations had been received from the Union of S. Africa or S. Rhodesia, and, although acknowledging that there was a strong body of European opinion in S. Africa which opposed the recognition of S., the gov. based no argument on that fact. S. was then induced to come to London with his wife (the latter did not accept the invitation) to see the secretary of state for commonwealth affairs, and during his absence from the reserve an exclusion order was made against him. Here the matter rested (April 1950), but it was obvious that the gov.'s decision might involve serious implications for the official colonial policy of far-reaching experiments in varying degrees of self-government throughout the African colonies and protectorates, for this policy is naturally prejudiced by anything which through racial discrimination intensifies the suspicion which prevails between Africans and Europeans. See J. Mockford, *Seretse Khama and the Bamangwato*, 1950.

Serf (Lat. *servus*, slave), term applied to a vassal or servant of a medieval lord. A S. was attached to the land on which he lived, and cultivated the soil in return for the protection given him by his master. Thus he differed from a slave in having certain privileges and rights of his own. Serfdom played an important part in the social life of the Middle Ages, and did not completely die out in England till the seventeenth century, colliers and salters in Scotland remaining in virtual serfdom until the reign of George III. The origins of the system in England are uncertain. In the social scale they ranked beneath the vassals, although in the centuries after Domesday the latter were depressed into what seems to have been a status akin to serfdom. The gradual growth of a cash economy, accelerated by the results of the Black Death, killed the system. See also **FEUDALISM**. The ss. of Russia were not emancipated till 1863. See P. Vinogradoff, *The Growth of the Manor*, 1905.

Serge, Alexandrovich (1857-1905), Grand Duke of Russia, was the son of the emperor Alexander II. and uncle of the emperor Nicholas II. He was governor-general of Moscow, and commander-in-chief of the forces there; but having acquired a great influence over his nephew, whom he urged to persist in his autocratic measures, he incurred the hatred of the people, and was assassinated in 1905.

Serge, twilled worsted material, with a rough surface. It is usually dyed black, navy blue, or some dark colour. Coat linings are made from silk S., a twilled silk variety. S. was once used for coverlets and curtains.

Sergeant, or Serjeant: 1. Formerly an officer in England, somewhat resembling the later bailiff of the hundred; also an

officer whose duty it was to attend on the king and on the lord high steward in court, to arrest traitors. This officer is now called the serjeant-at-arms or mace, and a similar officer attends the lord chancellor, the Speaker, and the lord mayor (see SERJEANT-AT-ARMS). 2. Common S.: a judicial officer appointed by the corporation of London to act as deputy or assistant to the recorder (*q.v.*). 3. Serjeant-at-law, see under SERJEANT-AT-LAW. 4. In military affairs: for this and sergeant-major see under RANK.

Sergipe, State of Brazil, on the Atlantic coast, N. of Bahia. The land between the sandy coast and the inland mts. is very fertile, watered by the São Francisco and other streams, and produces sugar, cotton, maize, tobacco, rice, coffee, cocoa, flax, and rubber. Grazing land is excellent. Cap. Aracaju, pop. 67,100. Area 8129 sq. m. Pop. 606,800.

Sergius, name of four popes:

Sergius I. (687-701), b. at Palermo c. 635, baptised King Ceodwalla of Wessex at Rome.

Sergius II. (844-47), during whose pontificate Rome was sacked by Saracens (846).

Sergius III. (904-11), was elected in 898, but was deposed by the anti-pope, John IX., and was not recognised by the emperor till 901.

Sergius IV. (1009-12), a Rom., was completely under the influence of the patrician families.

Serial Homology, see under HOMOLOGICAL.

Sericate, talc-like variety of mica, which occurs in soft inelastic scales in many schists as the result of the alteration of orthoclase feldspar.

Sericulture, see SILK AND SERICULTURE.

Seriema, see CARIAM.

Series, in mathematics, a succession of terms each of which is formed from its predecessor by some definite law. For cases of simple S. see ARITHMETICAL, GEOMETRICAL, HARMONIC PROGRESSION. A finite S. is one which terminates at some term; an infinite S. has an unlimited number of terms. The value or sum of a finite S. composed of finite terms must necessarily be finite, but an infinite S. may have a finite value. The sum of the infinite S. $1 + \frac{1}{2} + \frac{1}{4} + \dots$ can be examined geometrically. If P (Fig. 1) $\rightarrow 1$, and it

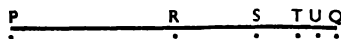


FIG. 1

be produced equally to Q, we may continue the S. by marking $RS = \frac{1}{2}$, $ST = \frac{1}{4}$, $TU = \frac{1}{8}$, and so on, taking each time half the space remaining to Q. However many terms we take, the last one will be nearer and nearer to zero and the sum approaches the limit PQ. The sum is finite since it cannot exceed 2. Such an infinite S. is convergent, when the sum of the first n terms cannot exceed a finite quantity, however great n may be. The quotient of $(1 - x^n)/(1 - x)$ is $1 + x + x^2 + x^3 + \dots$. If now, $x < 1$ the sum

approaches $(1 - x^n)/(1 - x)$, a finite limit, and the S. is convergent. If $x > 1$, by taking n sufficiently great $(1 - x^n)/(1 - x)$ can be made greater than any finite quantity, and the S. is divergent. A peculiar case occurs if $x = -1$, for the S. becomes $1 - 1 + 1 - 1 + \dots$ and the sum of an odd number of terms becomes 1, that of an even number 0. Such a S. is an oscillating one. A semi-convergent or accidentally convergent S. is one in which convergency depends on the alternation of

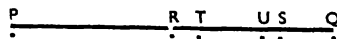


FIG. 2

positive and negative signs; e.g. $\log 2$, i.e. $1 - \frac{1}{2} + \frac{1}{4} - \frac{1}{8} + \dots$. Let PQ (Fig. 2) = unity. By successively marking the terms forward for positive, backward for negative (thus $PQ = 1$, $QR = -\frac{1}{2}$, $RS = \frac{1}{4}$, $ST = -\frac{1}{8}$, $TU = \frac{1}{16}$, etc.), it becomes evident that the value must always remain somewhere between Q and R, i.e. between 1 and $\frac{1}{2}$, and its value to four significant figures is 0.6931. The S. $1 + \frac{1}{2} + \frac{1}{4} + \frac{1}{8} + \dots$ is divergent; for $\frac{1}{2} + \frac{1}{4}$ is greater than 1, i.e. $\frac{3}{4}$; and $\frac{3}{4} + \frac{1}{8}$ is greater than 1, i.e. $\frac{7}{8}$; the following eight terms are greater than 1, i.e. $\frac{1}{2}$; that is, the S. is always greater than $1 + \frac{1}{2} + \frac{1}{4} + \frac{1}{8}$ and is therefore divergent. Many S. are of important practical application to science and engineering, e.g. those named above, and the binomial (which is basic to the general study of all S.), exponential, logarithmic, and hyperbolic S., as well as various trigonometrical series. See L. Toft and A. D. D. MacKay, *Practical Mathematics*, 1942; G. H. Hardy, *Pure Mathematics*, 1942; and B. B. Low, *Mathematics for Technical Students*, 1947. Most books on algebra deal with this subject.

Series, Connection, see under ELECTRIC CIRCUIT.

Serinagar, see SRINAGAR.

Seringapatam, tn. of Mysore, India, on an is. in the Cauvery R., 8 m. N. of Mysore. Formerly (1610-1799) the cap. of Mysore, its fort was built by Tipoo Sahib, and twice besieged by the Brit. Tipoo was killed during its capture in 1799. Pop. 15,000.

Seriphos, is., with an area of over 25 sq. m., belonging to the Gk. Cyclades. It lies 50 m. S. of the S.E. extremity of Euboea, and exports iron ore. Pop. 5000.

Serjeant, see SERGEANT.

Serjeant-at-Arms, that officer of the House of Commons whose duty it is to attend the Speaker, to carry out directions for the maintenance of order, to arrest strangers when necessary, to execute warrants for contempt, and to bring persons in custody before the bar of the House. The lord chancellor has a S. as attendant and mace bearer; and others are included in the royal household, with ceremonial duties.

Serjeant-at-Law. The dignity of S. prior to the Judicature Act, 1873, which virtually abolished the celebrated Brothers

of the Coif, was the highest rank at the Eng. Bar. The provision of the Judicature Act, above implied, was to the effect that the attainment of the rank of S. was no longer to be a condition precedent to becoming a judge. From 1873 the order has gradually disappeared, Lord Lindley being the last survivor. The order of the Coif enjoyed a most respectable antiquity, had its own settled rules and usages, and a distinguishing badge; the members were bound by oath to give counsel and legal aid to the king's people, and, as records one of their number, 'were for ages to be found at their ancient rendezvous in St. Paul's Cathedral, the *Parris*, or their allotted pillars there, wearing their distinctive costume, the robe and the coif, ever ready to receive those who sought their assistance . . . and to aid when called on in the judicial business of the king's courts.' The average number of S. in the nineteenth century was under thirty. Socially they ranked before king's counsel, and they enjoyed over the latter this advantage, that they could hold a brief against the Crown without a licence. See Serjeant A. Pulling, *The Order of the Coif*, 1884, and also vol. i. of Serjeant W. Ballantine, *Some Experiences of a Barrister's Life*, 1882.

Serjeants' Inn. Two former London inns of the serjeants-at-law (*q.v.*). In 1758 the two societies amalgamated.

Serjeanty, Petit, tenure by which the tenant was bound to render to the king annually some small implement of war, as a bow, a pair of spurs, a sword, a lance, or the like. It was analogous to tenure by free socage (*q.v.*); and *cf.* GRAND SERJEANTY.

Serlio, Sebastiano (1475-1551). It. architect and writer on art. He was the chief pupil of the celebrated architect Baldassare Peruzzi (*q.v.*), and acknowledges his indebtedness to Peruzzi's instruction. S. was one of the most distinguished followers of Alberti and the system or laws of the Italo-Vitruvian school. He was appointed architect at Fontainebleau palace by Francis I. He wrote *Architettura* (1584), one of the most inspired sources of information on the story of the It. renaissance.

Sermon, *see under* PREACHING and HOMILY.

Serous Fluids, body-fluids resembling or characterised by the presence of serum, the colourless portion of the blood. They are contained normally in the great sacs which envelop the heart, the lungs, the intestines, etc. Collections of S. F. take place as the result of abnormal conditions, as in the accumulations due to inflammation and the dropsies due to disturbances of the lymph circulation. S. F. are composed of water, white corpuscles, albumin, fats, fibrinogen, and other matter.

Serous Membranes, layers of tissue lining the closed cavities of the body, and characterised by the secretion of a serous fluid; they allow the organ to slide within its cavity. Such membranes are the pericardium, investing the heart, the two pleura, investing the lungs (pleurisy is an inflammation of these), the peritoneum,

investing the abdominal viscera, and the two tunicae vaginales, investing the testes. The membranes consist of two layers, a visceral and a parietal layer, between which is a small amount of serous fluid. Each layer in its turn consists of a layer of endothelial cells upon a protective coat of fibrous tissue.

Serowe, native tn. of Brit. Bechuanaland (*q.v.*), 250 m. N.N.E. of Mafeking, the cap. of the Bamangwato; it was founded by the chief Khama in 1903. Pop. 30,000.

Serpa Pinto, Alexandre Alberto da la Rocha (1846-1900), Portuguese explorer, served in the army in the colony of Mozambique. He then undertook an exploring expedition in S. Africa, and penetrated to the source of the Zambesi. In 1881 he received the gold medal of the Geographical Society of Paris. He was made governor of Mozambique in 1889, where he came into conflict with the Brit. on more than one occasion. He wrote *How I Crossed Africa* (trans. 1881).

Serpens (the Serpent), constellation which is found winding across the N. and S. hemispheres in contact with Aquila, Ophiuchus, Libra, Hercules, Bootes, and Virgo.

Serpent, obsolete bass wind instrument, so called from the tortuous shape of its wooden but leather-covered tapering tube. It was played with a cupped brass mouth-piece. There were six holes, which gave it a chromatic compass of three octaves. A Fr. canon of Auxerre is the accredited inventor (1590), and it was used both in bands and in churches, but fell out of use in the nineteenth century.

Serpent, *see* SNAKES.

Serpentine, mineral consisting of a massive compact hydrated magnesium silicate ($Mg_3Si_2O_5(OH)_4 \cdot H_2O$), crystallising in a monoclinic system. S. was in all cases originally an ultra basic igneous rock composed of olivine, but with some pyroxene, the rock having become decomposed to a mass of hydrous products. S. varies in colour from dull green to black, curiously veined or mottled with red, green, or blue. It is soft, easily worked and, from early times, has been carved into ornaments. It is also used for shop-fronts and, generally, as a building stone. The best-known example of S. in Britain is that of the Lizard, Cornwall, and other examples occur near Holyhead and neighbouring parts of Anglesey, Ballantrae, Ayrshire, and the Shetland Isles.

Serpentine, The, *see* HYDE PARK.

Serpent Worship, or **Ophiolatry**, commonly met with among savage tribes in diverse parts of the world, is a distinctive feature of many primitive cultures. Frequently the reptile is worshipped as the shrine of a deity. This was the case with the rattlesnake in the Natchez temple of the sun; with the snake which was the abode of Asklepios, the Gk. god of healing; and with the serpent associated with the beneficent Aztec god, Quetzalcoatl. Usually the serpent is regarded as an embodiment of craft and cunning; such a superstition accounts for the Semitic ser-

pent of Eden, the Apophis serpent of the Egyptians, and the awesome Azhi Dahaka of the Zarathustrans. The Sanskrit word *naga*, snake, signifies also the snake worshippers, who claim a descent from a reptile deity, and thus a link is afforded between opulidatry and totemism. A picturesque reason for their snake cult is offered by the Zulus, who, accepting the change of skin as an emblem of immortality, believe, like the African Maravi, that the spirits of the dead transmigrate into serpents. See J. P. Vogel, *Indian Serpent Lore*, 1926; W. D. Humbly, *Serpent-worship in Africa*, 1931; and J. J. Williams, *Voodooes and Obecs*, 1933.

Serpukhov, tn. of the Moscow Region of the R.S.F.S.R., on the Nara S.E. of Moscow. It has a cathedral of the fourteenth century. It has textile and iron and copper smelting works. Pop. 90,700.

Serpula, typical genus of the Serpulidae, a family of polychaetes. The species are marine worms, which secrete a calcareous tube. This is fixed to rocks or shells, and itself often forms reddish-coloured rocks when in masses, or assists in the formation of a substratum for coral reefs.

Serra da Estrella, see ESTRELLA, SERRA DA.

Serrano y Del Poz, Francisco, Duque de la Torre (1810-85), Sp. marshal and statesman, b. on the is. of León. Cadiz, achieved prominence whilst fighting against the Carlists (1831-39). From 1854 to 1866 he was a pillar of support to O'Donnell, accepting from him the captain-generalship of Cuba (1859-62), and fighting gallantly on his side during the Madrid insurrections (1866). Having assisted in securing the humiliation of Queen Isabella (1868) he acted as regent until the accession of King Amadeus (1870).

Serres, tn. and prefecture of Macedonia. The tn., on the R. Struma, lies in a fertile plain, and has trade in tobacco and cotton. There is also a silk-worm industry. Pop. (tn.) 29,600; (prefecture) 216,500.

Sertorius, Quintus (d. 72 B.C.), Rom. general and statesman, b. at Nursia, was at first a jurist and orator, but later entered the army and served at Arausio (105 B.C.), under Marius at Aquo Sextie (102 B.C.), and in Spain (97 B.C.), and in 91 B.C. was questor in Cisalpine Gaul. During the Civil war (88 B.C.), he took the side of Marius, the popular leader, and marched against Rome with Cinna in 87 B.C., being a party to, though disapproving of, the massacres which followed the fall of the city. He was praetor in 83 B.C., and on the return of his old enemy, Sulla, from the E., went as a kind of governor to Hither Spain, but was obliged to withdraw to Africa by the advance of Sulla. He carried on a successful campaign in Mauretania, and in 80 B.C. became leader of the Lusitanians against the Romans. He attained great power and popularity in Spain, where he ruled wisely, and defeated numerous Rom. armies. He was murdered by Perperna, his subordinate officer. See T. Mommsen, *History of Rome*, vol. IV., 1852 (trans. 1864), and R. E. Landor, *The Faun of Sertorius*, 1846.

Sertularia, genus of widely distributed plant-like Hydrozoa (i.e. animals resembling *Hydra*, and classified in the phylum Coelenterata), with a horny stem, sometimes simple, but often with many flexible, semi-transparent, yellow branches. Species are very numerous, with representatives in almost all seas.

Serum, liquid left after the blood corpuscles and fibrin of the blood have clotted. It is a straw-coloured liquid, rich in albumin. The term is employed in a general way to denote any body-liquid resembling the S. of the blood, especially animal fluids prepared to resist certain toxic agents. See SERUM THERAPEUTICS.

Serum Therapeutics, system of curing diseases by the administration, usually by injection, of substances from the blood of animals which have been rendered immune from those diseases. The morbid effects of bacteria depend chiefly upon the poisonous influence of substances called toxins, which are produced in the blood by their agency. Little is understood about the physiological and chemical action of these toxins; but healthy blood has the power of elaborating certain other substances called antitoxins, which in some way neutralise the action of the toxins. Not only is the disease itself immediately combated by the antitoxins, but an animal in whom the antitoxins have been produced is often rendered immune from subsequent attacks of the disease for a considerable period. The antitoxin substances are known to be contained in the serum, or colourless portion of the blood, which is itself a substance of very complex chemical constitution. The principle of antitoxin therapeutics is derived from the possibility of transferring serum containing antitoxin materials from one animal to another. For example, the bacillus, which causes diphtheria can be grown in broth until it develops a soluble toxin. The bacilli are then filtered off, and small doses of the toxin are injected into a horse. The blood of the animal resists the action of the toxin by developing an antitoxin. More doses of the toxin are injected in increasing quantity, so that the resistance of the horse to the disease becomes progressively greater. When the antitoxic power of the horse's blood is judged to be sufficient, the animal is bled, and the serum separated from the blood. The serum, after suitable testing, may then be injected subcutaneously into children suffering from diphtheria, with the result that the resisting power of the blood is considerably reinforced. The most elaborate precautions are taken in order to avoid introducing dangerous substances by the serum, but certain mildly painful symptoms are practically normal to the process. The beneficial results of the use of anti-diphtheric serum have led to the employment of antisera in other diseases, e.g. tetanus and gas gangrene. Serum drawn from a convalescent patient may be used to treat others in whom the disease is active, as, for instance, in measles. The Widal test for typhoid is based on the power of the appropriate serum to agglutinate the typhoid bacteria. See also

INOCULATION; VACCINATION. See A. R. Cushman, *Text-book of Therapeutics*, 1924, and S. O. L. Potter, *Therapeutics*, 1931.

Serval, or *Felis serval*, species of *Felidae* found in Africa. It is a tawny-coloured tiger-cat bearing black spots, and is about 2½ ft. long.

Servant, see MASTER AND SERVANT.

Servetus, Michael (Miguel Serveto) (1511-53), Sp. physician and theologian, b. at Tudela. In 1530 he went to Basle and there he first broached those opinions which afterwards drew down upon him the persecution of Calvin; and in 1531 his treatise against the doctrine of the Trinity was pub. S. spent three years at Lyons, and then went to Vienna, where he practised medicine, and quarrelled with Calvin. In 1553 S.'s work, *Christianismi Restitutio*, was pub., but without name. S. was suspected to be the author, was arrested, and sentenced to imprisonment mainly through the influence of Calvin. S. escaped, fled to Geneva, but was arrested through the medium of Calvin, and was put to death. See studies by R. Willis, 1877; A. Hyde, 1907; W. Osler, 1910; also A. Gordon, *The Personality of Michael Servetus*, 1910.

Servia, see SERBIA.

Service, Robert William (b. 1874), Canadian author; b. at Preston, Lancashire; son of Robert S., manager of the Preston bank. Educated at Hillhead High School, Glasgow, he served an apprenticeship with the Commercial Bank of Scotland, Glasgow, and emigrated to Canada in 1895. After some farming in Vancouver, he travelled up and down the Pacific coast, following many laborious occupations. In 1905 he joined the staff of the Canadian Bank of Commerce in Victoria, B.C., being transferred to Kamloops; later to White Horse, Yukon ter.; thence to Dawson. He spent eight years in the Yukon, travelling extensively. He pub. his early poems, *Songs of a Sourdough* in 1907 and *Ballads of a Cheechako* in 1909, and was known as 'the Canadian Kipling'. As correspondent of the *Toronto Star* in the Balkan war he was in Europe 1913-14; he was living and writing in Paris when the First World War began. He acted for the *Toronto Star*, and drove an ambulance for two years in a medical div. Other books are *Trail of '98: a Northland Romance* (1911); *The Pretender* (story of the Lat. Quarter, 1914); *Rhymes of a Red Cross Man* (1916); *The Poisoned Paradise* (novel, 1923); *The Rough-neck* (tale, 1923); *The Master of the Microbe* (fantastic romance, 1926); *The House of Fear* (novel, 1927); *Why Not Grow Young?* or, *Living for Longevity* (1928); *Bar-Room Ballads*, 1940; and *Harper of Heaven* (1948). His rhymes and ballads were pub. in a collected ed. in 1930, and his autobiography, *Ploughman of the Moon*, in 1946.

Service Decorations, see DECORATIONS FOR WAR SERVICES.

Service, Musical, name employed to denote special settings of matins and evensong, and sometimes of holy communion, used in the Church of England. These services are called by the names of their

composer, and the key in which they are written. S. S. Wesley strongly influenced the composition of service music. Particularly well-known services are those of Tallis, Purcell, Croft, Stainer, Onseley, and Stanford.

Service, Social, see SOCIAL SERVICE.

Service Tree, or **Sorb** (*Pyrus sorbus* or *domestica*), small tree with planate leaves and small pear-shaped fruit. The wild S. T. (*P. torminalis*), a native of Britain, is also a small tree with lobed leaves and cymes of white flowers followed by small green mottled fruit known as 'chequers.' The mt. ash (*P. aucuparia*), the white beam (*P. aria*), the crab apple (*P. malus*), and the pear (*P. communis*) belong to the same genus.

Servile Wars, **The**, were fought in Sicily, where at two periods (135-132 B.C. and 104-101 B.C.) the downtrodden slaves rose in formidable insurrections against Rome the oppressor. Torture, starvation, and injustice were suffered from overseers, who, at the bidding of the landowner, forced them to toil in chained gangs. Rutilius, the consul, crushed the first revolt, when Eunus, a Syrian juggler, was leader, by capturing Enna and Tauromenium, the slaves' strongholds. The second and more formidable came to an end after Tryphon's death and Athenio's defeat in battle.

Servites, or **Servants of the Blessed Virgin**, religious order instituted in 1233 in Tuscany by Buonfiglio Mondaldi, a Florentine, with six of his comrades. It underwent reformation in 1593.

Servitude, in Scots law, following Rom. law, 'a burden affecting lands or other heritable subjects by which the proprietor is either restrained from the full use of his property or is obliged to suffer another to do certain acts upon it which, were it not for that burden, would be competent solely to the owner' (Erskine). S. are classified by Erskine into natural, legal, or conventional. Natural S. require no further explanation; legal arise by statute or custom, the most numerous examples being the restraints imposed by statutes in the interests of public health. The chief kinds of conventional S. are 'predial' S. or S. proper; these are real burdens, i.e. those which the owner of a tenement enjoys over the owner of another tenement (dominant and servient tenements respectively). Examples are rights of way, light and watering (see also THIRLAGE). The term personal S., which is used in contradistinction to predial, denotes those S. which one person enjoys over another irrespective of the possession of property; examples are life-rent (q.v.) and terce. S. are extinguished by both tenements becoming the property of one person, or by voluntary surrender, or by non-user.

Servius Honoratus, Maurus (or **Marius**), celebrated Lat. grammarian, contemporary with Macrobius, who introduces him among the *dramatis personae* of the *Saturnalia*. His most celebrated production was a commentary upon Virgil.

Servius Tullius, sixth king of Rome, reigned 578-534 B.C. See **ROME, History**.

Sesame (*Sesamum*), genus of annual plants, with axillary flowers like those of the foxglove. *S. orientale*, a common Indian plant, is cultivated for the yellowish fatty oil obtained from the seeds and used as a food, in soap-making, and as an illuminant.

Sesamoid Bones, small rounded bones resembling sesame seeds, which are developed in tendons subjected to much pressure by gliding over bony prominences, etc. The largest example in the human body is the patella, or knee-cap.

Sesamum, see BENNY OIL.

The jurisdiction is as wide and subject to the same limitations as that of the co. sessional courts (see also RECORDER). The petty sessions sit (i.) to dispose of trifling offences without a jury (see also SUMMARY JURISDICTION) and (ii.) to investigate grave offences and, if the evidence given by the prosecution shows a *prima facie* case, to commit the accused for trial. When justices in petty sessions commit a prisoner, he must by the Assizes Relief Act, 1889, be tried at quarter sessions and not at the assizes, unless the justices or a judge in chambers make an order to the



Royal Norwegian Embassy

A SETER NEAR KONGSVEIEN IN DRIVDALEN, TRONDHESLAG

Sesostris, (Gk. corruption of Egyptian Sen-usret or Senusert; also transliterated to Usertsen. There are said to have been three kings of this name in anct. Egypt, all of the twelfth or Theban dynasty: *Sesostris I.* (c. 2133 B.C.); *Sesostris II.* (c. 2370 B.C.); and *Sesostris III.* (c. 2340 B.C.); second, third, and fourth kings respectively of the dynasty.

Sessa (anct. *Suessa Auruncorum*), tn., with a Romanesque cathedral and Roman remains, 27 m. by rail W.N.W. of Caserta, in Campania, Italy. Pop. 26,200.

Session, Court of, see COURT OF SESSION.

Sessions of the Peace. S. of the P. are either (1) general (quarter) S. of the P. for the co. (as to which see COUNTY SESSIONS), or (2) bor. quarter sessions, or (3) petty sessions. Most corporate tns. or bors. have their own quarter sessions and recorder, the possession of which renders them completely independent of the co.

contrary (see also JUSTICES OF THE PEACE).

Sestertius, Rom. coin, the fourth part of a denarius, and thus containing at first 2½ asses and later 4 asses. Its value was about 2d. The Rom. symbol for it was HS or HS, and it is often denoted in classical writers by *nummus*, from *sestertius nummus* (two-and-a-half coin).

Sestius, see SEXTIUS.

Sestus, anct. tn. of Thrace, on the Hellespont, opposite Abydos, was founded by the Æolians. It was celebrated in anct. classical poetry on account of its connection with the story of Hero and Leander.

Sôte, see CETTE.

Seter (Old Norse, a seat), picturesque outlying pasturage in Norway where live-stock, driven up in the spring, remain until autumn. The S. generally has a log house with turf roofing in which the *seterjenter* (S.-girls) live, but, contrary to

operatic romanticism, is a busy dairy-farm, the prin. product being cheese.

Seth, Egyptian god, *see under* OSIRIS.

Seth, Andrew, *see* PRINGLE-PATTISON.

Sethites, or **Sethians**, Gnostic sect which flourished in the second century. They formed a div. of Ophites, and held that Jesus Christ was a reincarnation of Seth, the first son of Adam.

Seth, name of two Egyptian kings of the nineteenth dynasty. *Seth I.*, son of Rameses I. and the father of Rameses II., reigned c. 1355 B.C., he was a soldier, and his campaigns against Palestine, Syria, Libya, and the Sudan were successful, and he returned home laden with spoils. He continued the building of temples and added seventy-nine columns to the hall of columns at Karnak; he reopened the copper-mines of Sinai, and built many good roads. He commenced a beautiful temple at Abydos, but died before it was finished. His tomb has been discovered at Thebes. *Seth II.*, reigned c. 1250 B.C., was the last king of his dynasty.

Sétif, tn. of Algeria, dept. of Constantine, 80 m. S.E. of Constantine. It is a fort. tn., and has a beautiful mosque. Pop. 32,800; (arron.) 391,500.

Settif, *see* CÉRTTE.

Set Off. S. O. is a statutory defence to an action, by means of which a defendant is allowed to meet the plaintiff's claim (wholly or partly) by 'setting off' a claim against the plaintiff. It exists only in respect of mutual debts, and the two debts must (1) be due in the same right and between the same parties (e.g. a claim by a man in his personal capacity cannot be S. O. against a claim made against him as an executor) and (2) be for a liquidated (i.e. definite) amount; and further, a debt accruing due after the issue of the plaintiff's writ cannot be pleaded as a S. O., though it can be pleaded as a counter-claim. A S. O. differs from a counter-claim in that it is a defence and not a cross-action; so that if the defendant succeeds in establishing a S. O. against the whole of the claim made against him the plaintiff has to pay all the costs of the action; but the successful proof of a counter-claim will only carry the costs of such counter-claim.

Seton, Sir Alexander, *see* DUNFERMLINE, EARL OF.

Seton, Ernest Thompson (1860-1946), Canadian naturalist, writer, and artist, b. at South Shields, co. Durham, England. He lived in the Canadian backwoods from 1866 to 1879, and was educated at Toronto. He returned to England and studied at the Royal Academy school. He is best known for his books about wild life, and for his foundation of the Woodcraft League in the U.S.A. His chief works are *Lives of the Hunted* (1901); *Wild Animals I Have Known* (1902); *Animal Heroes* (1906); *Rolf in the Woods* (1911); *Woodcraft Boys* (1917); *Lives of Game Animals* (1925-28); and *The Biography of a Grizzly* (1931).

Seton, Family of, derive descent traditionally from David de Say, an Anglo-Norman to whom David I. of Scotland

made a grant of lands in E. Lothian which hence got the name of Say-toun or S. The first notable scion was *Sir Christell* (c. 1278-1306), who did homage to Edward I., but is supposed to have been hanged by him at Dumfries for going over to the Bruce, whose sister he had married. *Sir Alexander*, probably Christell's brother, was Bruce's ambas. to England, and defended Berwick against the Eng. in 1333. *Sir William* (d. 1393) is said to have been ennobled as Lord S. *Sir John* (d. c. 1441) was father to *George*, the first of the recognised barons S. The fifth baron (*George*), who died in 1585, was a close friend of Mary Queen of Scots. *Mary*, one of the queen's 'four Marys', is supposed to have been his half-sister. The sixth baron, *Robert* (d. 1603), became first of the earls of Wintoun, whose titles were forfeited by the fifth earl, *George* (d. 1749), in 1716. Cadet branches extant as baronetcies are S. of Abercorn and S. of Pitmedden.

Seton, artificial fistula produced by drawing threads through a fold of the skin; also the substance used to produce the channel. The object of the process is to supply a drainage-channel for a wound, or to provide a counter-irritation which shall persist for some time. A fold of the skin is pinched up, and the skein of oiled cotton or silk is drawn through by a needle. It is necessary to move the skein backwards and forwards occasionally to keep the channel open.

Seton-Watson, Robert William (b. 1879), Eng. historian, b. in London, educated at Winchester and New College, Oxford. His work is authoritative on the hist. of Austria-Hungary and of the Balkans, and in 1922 he became Masaryk prof. of central European hist. in London Univ. He later became Creighton lecturer in the univ. of London, 1928, and Raleigh lecturer at the Brit. Academy in 1932. He has devoted a lifetime to a study of central European problems and Balkan hist. and politics, and awakened Eng. public opinion to the significance of the Austrian Succession states. Pub.: *The Southern Slav Question* (1911); *Roumania and the Great War* (1915); *The Rise of Nationality in the Balkans* (1917); *Europe in the Melling Pot* (1919); *The New Slovakia* (1924); *Slovakia Then and Now* (1931); *A History of the Roumanians* (1935); *Disraeli, Gladstone, and the Eastern Question* (1935); *From Munich to Danzig* (1939); and *History of the Czechs and Slovaks* (1943).

Setschuan, or **Setschwan**, *see* SZECHWAN.

Sett, *see under* TARTANS.

Sette Comuni, *see* VICENZA.

Setter, dog which has been trained to assist in taking game, sitting or crouching instead of pointing, like the less active but more keenly scented pointer. The breed was long known as the spaniel, from which it is descended. There are three varieties, the Eng., the Scottish, Gordon, or black-and-tan, and the Irish. The Eng. S. is a handsome, good-tempered, and easily trained sporting dog; in colour it is black or blue and white, orange and white, tan and white, lemon and white, and liver and white. The Scottish or Gordon S. is

the least known, though a number of specimens of the breed are in use in the U.S.A. and on the Continent. It is heavier than the other varieties, and probably bloodhound stock was used in forming the breed. The Irish S. is keen-scented, and when thoroughly broken is untiring. It is red or red and white, and is lighter and more elegant in build than the Eng. variety.

Settle, Elkanah (1618-1724), Eng. poetaster and playwright, b. at Dunstable. Set up by Rochester as a rival to Dryden, he attacked the laureate in a preface to *The Empress of Morocco* (1673). The success of *The Empress of Morocco* annoyed Dryden and his friends, and a paper war ensued, culminating in 1682 with the pub. of Dryden's (and Tate's) *Second Part of Absalom and Achitophel*, in which S. was pilloried as Doeg; S. retorted in the same year with *Absalom Senior, or Achitophel Transposed*.

See F. C. Brown, *Elkanah Settle: His Life and Works* (with bibliography), 1910.

Settle, mkt. tn. of the W. Riding of Yorkshire, standing on the l. b. of the R. Ribbles, 16 m. from Skipton. Henry III. granted a market charter to the tn. in 1249, and a new charter was granted by Queen Anne in 1705. S. originally held an important position on the route between Lancaster and York, and later it retained this importance when the road from Leeds to Kendal became the busier. There are cotton-mills and paper-mills in the tn. The surrounding limestone country is famous for its caves and gorges, including Alum Pot, Gaping Gill, and Malham Tarn. Giggleswick School is near by. Pop. 3000.

Settlement, Act of, see ACT, Act of Settlement.

Settlements. In Eng. law a settlement denotes an instrument 'designed to regulate during a specified period the enjoyment of property, and to provide during the same period for the safe custody and prudent management of the subject-matter of that property.' S. may be classified, with reference to the occasions on which they are made, into (1) marriage S., (2) family S., (3) separation deeds, and (4) voluntary S. A cross-div. is into real and personal S.; but the customary mode of settling land is often applied, as far as the rules of limitation (*q.v.*) allow, to S. of personality (*q.v.*). The most familiar kind of settlement is that which is made on the occasion of marriage. Family S. are also often made on marriage, but whereas a marriage settlement provides for a *new* family, whose heads are to be the intended spouses, a family settlement provides for the members of an existing family. If made on the occasion of the marriage of one of the members of the family, provision is made not only for the intended spouses and their issue, but also for other members of the family in whom the property to be settled is already vested. A family settlement might also be made on the attainment of his majority by the eldest son of a wealthy family on whom the property has been by a former instru-

ment settled in tail (see DE DONIS; FEE, FEE SIMPLE, AND FEE TAIL; and LAND LAWS). This last kind of settlement is called in law a re-settlement, or, if it does not entirely abrogate the terms of the old settlement, forms with the latter a compound settlement. Its fundamental object was to ensure as far as the rule of perpetuities allows (see PERPETUITY and LIMITATION OF ESTATES) that the family estates should remain the property of the eldest male representative of the family (this is called a strict settlement in contradistinction to a personal settlement, the object of which is to ensure that the proceeds of property shall be preserved as a provision for the family of a certain person), though provision is also usually made for younger sons.

Separation deeds are as their name indicates, made on the occasion of some matrimonial difference, and are either drawn up by the parties' solicitors without recourse to court, or, if the court has decreed a dissolution of marriage or a judicial separation (*q.v.*), are made either by way of variation of existing S. or in the shape of a settlement of damages awarded in favour of the non-guilty spouse, so as to afford maintenance for that spouse during his or her life. (It is unusual to settle a part of the guilty wife's property on a husband, though it is often desirable where he happens to be poor and to have issue.) Separation deeds usually contain a covenant (*q.v.*) by the husband that he will pay certain sums to trustees for the wife's maintenance, and a covenant by the trustees that they will indemnify him against his wife's debts. The deed generally contains, in addition, clauses in which the spouses mutually covenant not to molest or interfere with each other and not to sue for restitution of conjugal rights.

A voluntary settlement is one that is not made for valuable consideration (*q.v.*), a future marriage constitutes valuable consideration, and hence an ante-nuptial settlement cannot be impeached even by the husband's creditors except on the ground of fraud. But a post-nuptial settlement, however meritorious its objects, is in law deemed to be a voluntary settlement, and is liable to be upset either (i.) by creditors who can show that they have been defeated or delayed by it, or (ii.) by subsequent purchasers for value of the property if it is realty (*q.v.*), whether they have or have not had notice (*q.v.*) of the prior voluntary settlement, and (iii.) by the settlor's trustee in bankruptcy, where the settlor becomes bankrupt within two years after executing the settlement. If he becomes bankrupt within ten years of execution the settlement will be void only if the grantee cannot prove that at the time of execution he was able to make the grant without rendering himself insolvent; and further, that immediately on the execution the property passed to the grantee. Settlement may be made either by deed, by will, or by unsealed declarations of trusts. More S. it seems, are made by will than by deed, though since a will is 'ambulatory' till death, i.e.

revocable, the deed is the more satisfactory mode from the point of view of beneficiaries other than the settlor himself.

Any person not under any legal disability may make a settlement. The only important cases of incapacity (see CAPACITY) to make a settlement are those of infancy, mental unsoundness, and bankruptcy. Boys under twenty and girls under seventeen and bankrupts until discharged are incapable of settling property. Prior to the passing of the Married Women (Restraint upon Anticipation) Act, 1919, a married woman restrained from anticipation could not settle her own separate property. An Act of 1936 prohibited the use of the restraint clause in instruments made after 1939, but left existing restraints unimpaired. The latter, however, were ended by the Act of 1949, with the result that every woman is now capable of making a settlement of her own separate property (see further under RESTRAINT UPON ANTICIPATION).

Strict S. generally follow a stereotyped form, though not infrequently they combine the forms of both a strict and a personal settlement. In this latter case the husband's estate is limited strictly to the eldest male descendant of the intended marriage, and the wife's is used as a fund for making adequate provision for those other descendants who are excluded from the enjoyment of the hereditary estates (see INHERITANCE). A strict settlement generally contains the following parts: a fee-simple estate (see FEE, etc.) to the husband determinable on the marriage; a charge of pin-money for the interested wife; a life estate for the husband (i.e. after the marriage); a jointure (q.v.) for the wife; a portions (q.v.) term; an estate tail to the issue of the husband; a hotchpot (q.v.), a maintenance (q.v.), and advancement (enabling trustees to advance sums to children to set them up in business, etc.) clauses. The chief clauses of a personal settlement are those which locate a trust for sale of property, a trust of the income and corpus, and specify the powers of management vested in the trustees.

Settled Land Act, 1925.—This Act repeals all the previous Settled Land Acts and consolidates the law on the S. of land. It should first be observed that the new Property Acts make a number of profound changes in the old law of real property. *Inter alia* they provide that persons who are incapable of dealing with land are disabled from holding legal estates or interests (see EQUIT; ESTATE); such persons are infants and persons entitled in fee simple (see FEE) subject to any provision for defeasance or to family charges. The Act also included in this category married women subject to a restraint upon anticipation, but, as has been mentioned above, the restraint upon anticipation has been abolished. All such persons are now regarded as tenants-for-life under a settlement.

The holding of legal estates in undivided shares is now prohibited, estates formerly so held being vested in trustees

for sale to convert the beneficial interests into cash. Estates capable of existing at law can now only be either estates in fee simple or for a term of years, and legal interests (i.e. as opposed to 'equitable') are restricted to easements, rent-charges, mortgages, land tax, and tithe rent charge, and rights of entry in respect of a term of years or rent-charge; all other estates or interests or powers now taking effect only in equity. The whole object of these provisions is to ensure as far as possible that the title to real property shall eventually consist of a series of simple documents or conveyances and leases, together with the necessary probates or letters of administration. To this end, too, the devolution of real and personal estates on death has been assimilated, as far as possible, real property, on intestacy, vesting in the administrators on trust for sale (see SUCCESSION, INTESTATE). It is sought by the Settled Land Act of 1925 to apply these principles (the so-called 'curtain' provisions of the Property Acts) to the case of settled land. The legal estate for life of the tenant-for-life has now gone, the Act having given the tenant the means of acquiring the legal estate in fee simple; while, on a sale, instead of conveying all the estate forming the subject of the settlement, as the tenant-for-life was, under the repealed Acts, empowered to do, the tenant now conveys the estate in fee simple vested in him. The tenant-for-life now has increased powers of dealing with the land in the way of effecting improvements and granting leases (building and forestry leases, 999 years; mining, 100 years; other leases, 50 years). Again, no longer has the tenant to submit schemes for improvement to the trustees; and, generally, his powers are extended at the expense of those of the trustees. It may be noted here that S. by way of trust for sale are no longer to be regarded as S. of land within the meaning of the Settled Land Acts; the trustees for sale have the powers of a tenant-for-life and of the trustees of the settlement, so that they are able to delegate the power of leasing and management, though not of sale, until sale, to any person temporarily entitled to the net rents.

In the 'curtain' provisions (see *supra*) the Property Acts have attempted to simplify abstracts of title by making the purchaser rest satisfied with the reception of the legal estate and excluding from his consideration equitable interests. It would seem that this attempt has only partly succeeded, and the general opinion is that the necessity for investigating equitable interests is not disposed of, when examining title prior to the first vesting deed (the vesting deed or instrument constitutes the tenant-for-life an express trustee for the persons beneficially interested in the settlement, and is meant ultimately to form a simple root of title). Again, the prin. object of S. has always been the preservation of the property for succeeding generations; but it is evident that the present incidence of the death duties is a serious bar to the accomplish-

ment of this object. A possible palliative is offered by life insurance, and it is the practice in some cases to settle, at the time of the settlement of the realty, a considerable sum of personality, the income of which may be applied to the provision of premiums on the insurance of the life of the tenant-for-life. If such course be followed, the policies are included in the settlement, and the tenant-for-life is allowed to take any balance not required for such premiums (*see also* LANDLORD AND TENANT).

Settled Land and Trustee Acts (Courts' General Powers) Act, 1913.—Extends the powers of the courts to sanction expenditure out of capital in respect of repairs, maintenance, and management of settled land, subject to rather strict conditions. The first condition is that the person who would normally bear that expenditure, who would be the tenant-for-life, has to satisfy the court that his available income from all sources is insufficient to meet this expenditure on maintenance or management which would normally fall to be met out of income, and he has to show that that is due to war circumstances. The most obvious war circumstance is the very large increase in direct taxation, but there are also cases where the income of settled estate has been drastically affected by war damage. In the second place, he has to satisfy the court, and this is really the basic principle of the Act, that the expenditure is in the interests of all those concerned; that it is in the interests of the property and the upkeep of the property, whether agric. or house property, that this expenditure should be made, and not for some personal extra comfort for himself. The Act is a purely temporary measure.

See Sir A. Underhill and J. A. Strahan, *Principles of Interpretation of Wills and Settlements* (3rd ed.), 1927; E. P. Volstenholme and Sir B. L. Cherry, *Conveyancing Statutes, etc.* (12th ed.), 1932; C. M. Lush, *Law of Husband and Wife* (4th ed.), 1933; J. C. Arnold, *Settled Land Acts*, 1937; and H. J. Hood and H. W. Challis, *Property, Settled Land, Trustee, and Administration Acts, etc.* (8th ed.), 1938.

Settlements, Book of, *see* LANDMAY-BOK.

Settlements, Social, *see* SOCIAL.

Setts, *see under* ROADS, *Construction*.

Setúbal, seaport of Estremadura, Portugal, on the bay of S., 18 m. S.E. of Lisbon. It has a good harbour, and ranks as the third commercial city of Portugal, its chief exports being sardines, fruit, salt, wine, and corks. Pop. (prov.) 208,800; (tn.) 35,000.

Seurat, Georges Pierre (1859–91), Fr. painter; b. in Paris; son of Chrysostome Antoine S., a *huissier* or bailiff, in good circumstances. At sixteen S. entered the Ecole des Beaux-Arts, where he studied for four years under Henri Lehmann. After his year's military service he resumed studies in drawing and sketched in the environs of Paris, making special study of Delacroix's frescoes in St. Sulpice. In 1884 his painting 'La Baignade,' which is now in the Tate Gallery, London,

refused by the Salon, was exhibited at the Indépendants, organised that year. Their president, Signac, initiated S. in the methods of the Impressionists. 'Un Dimanche d'été à la Grande-Jatte' (1886) is declared 'the first picture executed entirely in the divisionist technique, also known as Pointillisme, the distinguishing mark of the Neo-Impressionist School.' A close approach to what might be called Patternism, characteristic of the Post-Impressionists, is to be seen in 'Chahut,' 1890. 'Cirque,' 1891, is the last of his works. He also painted an excellent portrait of Signac, *pointilliste* painter, and landscapes of Normandy, Asnières, etc., among them 'Berge herbeuse' (1882) 'La Seine à Asnières' (1883); 'Le Fort Samson, Grandcamp' (1885); 'L'Hospice et le phare à Honfleur.' He died in Paris, his death unnoticed by the press. *See* lives by L. Cousturier, 1921, and G. Coquist, 1924; also J. Rewald *A History of Impressionism*, 1947.

Sevastopol, or Sebastopol, Russian naval station on the Black Sea, in the Crimean Region of the R.S.F.S.R. It is on the S.W. coast of the Crimea, and is connected by rail with Moscow. The roadstead, one of the best in Europe, runs E. and W. for about 4 m., with an average width of ½ m. The present fn., built after the Crimean war (1854–56), is a favourite seaside resort, and before the Second World War had a zoological marine station (1897), two cathedrals, and a museum commemorative of the siege of 1854–55 (*see* CRIMEAN WAR). It was made a third-class fortress in 1890. In 1920 it fell to the Bolsheviks. There was a state dockyard here. S. fell to the Gers. on July 1, 1942, after a most heroic defence. Pop. (1939) 112,000. *See further under* EASTERN FRONT *or* RUSSO-GERMAN CAMPAIGNS IN SECOND WORLD WAR.

Sevčík, Ottakar (1852–1931), Bohemian violinist, b. at Horazdovice, Bohemia, famous as a teacher of the violin. Among his pupils were Jan Kubelik and Marie Hall. He was prof. of the Czechoslovak Conservatoire before the Second World War.

Seven, number to which mystical and symbolical meanings have been attached from very early times, particularly in the E.; instances of its use as a mystical number among the Jews might be multiplied indefinitely. S. was the perfect number and denoted completeness. Thus the whole Church is symbolised in the Book of Revelation by the 7 candlesticks, and the perfect power of the Lamb is denoted by 7 horns. The use of the number is also frequent among the Gks. Its origin may well be astronomical, e.g. from the 7 planets and the intervals between the sev. phases of the moon.

Seven Bishops, The, *see* BISHOPS, THE SEVEN.

Seven Champions, The, of Christendom were St. George of England, St. Andrew of Scotland, St. Patrick of Ireland, St. David of Wales, St. Denis of France, St. James of Spain, and St. Antony of Italy.

Seven Days Battle. This was a famous series of engagements during the Amer. Civil war, when Federal troops under Gen.

G. B. McClellan were in sight of Richmond, the Confederate cap., in the summer of 1862, and it looked as if they might by a bold stroke capture it. McClellan, however, was always cautious, and, moreover, the swamps in the Chickahominy R. valley made a sudden dash by his troops almost impossible. In the fighting at the preceding battle of Fair Oaks Gen. J. E. Johnston had been severely wounded, and the chief command of the S. army now fell to Gen. R. E. Lee. The latter decided that Richmond must be made safe at all costs, and quietly drew in reinforcements for his army until it numbered 90,000 men. Lee wanted not only to save the cap., but to encircle and trap the army of the Potomac under McClellan. Thus ensued the S. D. B., Mechanicsville, June 26; Gaines Mill, June 27; Savage Station, June 29; Glendale, June 30; and Malvern Hill, July 1. While the earlier battles were going on, McClellan adroitly moved the main bulk of his army to Malvern Hill, intending to form his base on the James R. At Malvern Hill McClellan had all the advantages, and defeated Lee, who now withdrew to the entrenchments at Richmond. McClellan planned to start for Richmond again when conditions favoured but was suddenly ordered to abandon his position and bring his army back near Washington. Thus were thrown away all the advantages he had won.

Seven Dials, London dist., so named because seven streets converge there. It is between New Oxford Street and St. Martin's Lane. Once narrow and of unsavoury repute, and a centre for printing and selling ballads, it has long been widened and has changed its character.

Seven Dolours of the Blessed Virgin Mary, Feast of the festival of the Rom. Catholic Church, celebrated on the Friday before Palm Sunday. The seven sorrows of the Blessed Virgin are considered in relation to the prophecy of Simeon that a sword should pierce her own heart also.

Seven Hills, The, in Rhineland, Germany, see SIEBENBURG.

Seven Hunters, see FLANNAN ISLANDS.

Seven Kings, dist. of Essex, 9 m. from Liverpool Street. It is mainly residential and forms part of Ilford. Pop. 12,000.

Sevenoaks, urb. dist. and tn. in Kent, England, 22 m. S.E. by S. of London, on the N. Downs. The church (St. Nicholas) is chiefly Perpendicular. The grammar school was founded by Sir W. Sevenoke in 1418. The Vine is regarded as the oldest cricket-ground in England. Knole Park, a fine property of the National Trust, and home of the Sackvilles, contains a magnificent series of historical portraits, and fine furniture and fittings. Pop. 36,700.

Seven Pines, see FAIR OAKS.

Seven Sleepers of Ephesus, heroes of a celebrated legend told by Gregory of Tours in *Miraculorum Liber*. To avoid the persecutions of Decius (A.D. 250), seven Christian brothers took refuge in a cave, which was blocked up by their pursuers. They fell into a sleep, and awoke nearly 200 years later, in the reign of Theodosius II. (447).

Seventh-Day Adventists, see under ADVENTISTS.

Seven Weeks War. The partition of Schleswig-Holstein, won by Austria and Prussia from Denmark in 1864, led to various disputes, out of which grew the conflict between Austria and Prussia for the hegemony of the Ger. Confederation. Both sides armed for the struggle, the smaller Ger. states siding with Austria, while Prussia was in alliance with Italy, who was promised the provs. of Venetia. In June 1866 Bismarck mobilised the Prussian army and occupied Holstein, Hesse, Saxony, and Hanover. Benedek, the Austrian commander, awaited the Prussians on the Upper Elbe in Bohemia. At their head was King William, with his ministers Bismarck and von Roon, and Moltke, chief of staff. Concentrating his troops near Königgratz and Sadowa (the battle which ensued being called after both places), Benedek met the Prussian Army on July 3. The battle was a decisive defeat for the Austrians, costing them 18,000 dead, 20,000 wounded, and 160 cannon. In Italy the Austrians were more successful. Italy had declared war on June 20, and against the Austrian expedition of 150,000 men she opposed a force of 300,000. La Marmora, who resigned the premiership to take command of the It. Army, was at variance with his fellow strategists. On June 24 the Austrians took Custoza, but were repulsed from Villafranca. The drawn battle, however, was a loss to the It., who retreated. La Marmora resigned his command, and the It. Army, having retreated, was unable to harass the withdrawal of Austrian troops from Venetia to replace their losses at Sadowa. The It. pride was their fleet, but this was badly beaten by the Austrian admiral, Tegetthof, at Lissa (July 20). Garibaldi's Volunteers, however, after an initial defeat at Vezza (July 5), were victorious at Ampola (July 16-19) and Bezzena (July 21). To secure the mediation of France the Austrian emperor, Francis Joseph, ceded Venice to Napoleon III., who then offered it as a gift to Italy. The It., considered this an ignominy, and Prussia also refused Napoleon's mediation, except on the basis of a new Germany under Prussian leadership from which Austria would be excluded. Further Prussian successes were gained by Falkenstein at Kissingen, where the Bavarians were routed (July 10), and at Aschaffenburg (July 11). On July 16 Falkenstein entered Frankfurt and took over the gov. for the king of Prussia. In Austria itself the Prussians were advancing on Vienna after victories at Tobitschau and Roknitz. On July 26 an armistice was signed at Nikolsburg. Prussia also concluded peace on generous terms with Wurttemberg on Aug. 13; with Baden on Aug. 17; and with Bavaria on Aug. 22. The peace of Prague with Austria (Sept. 23) excluded Austria from Germany (this policy, however, was not altogether in accordance with Bismarck's plans) and imposed a war indemnity. On Oct. 3 the peace of Vienna between Austria and Italy allowed for 'the union of the Lombardo-Venetian kingdom with the

kingdom of Italy,' while Italy assumed the Lombardo-Venetian debt of 64,000,000 francs. A plebiscite in Venice (Oct. 19) declared for union with Italy, and on Nov. 7 Victor Emmanuel entered the city in triumph. See H. Kohl, *Deutsche Einigungskrieg*, 1912, and A. Schlieffen, *Camée*, 1925.

Seven Wise Men, certain Gk. sages whose aphorisms were inscribed in the temple of Apollo at Delphi. Their names, with their saws, are Solon of Athens, 'Nothing in excess'; Thales of Miletus, 'Suretyship brings ruin'; Bias of Priene, 'An excess of workers spoils the work'; Pittacus of Mitylene, 'Know thine opportunity'; Chilo of Sparta, 'Know thyself'; Periander of Corinth, 'Have forththought in everything'; Cleobulus of Lindus, 'Moderation is the highest good.'

Seven Wonders of the World were held to be the pyramids of Egypt; the so-called hanging gardens of Semiramis at Babylon; the temple of Diana at Ephesus; the colossus at Rhodes; Phidias's statue of Jupiter at Athens; the Mausoleum at Halicarnassus, and the lighthouse on the is. of Pharos at Alexandria.

Seven Years War, or **Third Silesian War**, name given to a period of war (1756-1763), fought on the continent of Europe by Frederick the Great of Prussia, aided by subsidies and troops from Great Britain against a coalition of Austria, Russia, France, Sweden, and Saxony, and by Great Britain against France, later aided by Spain on sea and on land, mainly in N. America and India. While the continental war is of great importance in military hist. on account of Frederick's masterly campaigns, the Brit. war laid the foundation of Brit. naval supremacy, of the Indian Empire, and of the final withdrawal of Fr. rivalry in N. America. At the close of the war the peace of Paris (1763) left Great Britain practically the sole colonising power and the mistress of the seas, while the peace of Hubertsburg, in the same year, estab. Prussia in Pomerania and Silesia, and recognised her as the equal of Austria and laid the foundations of modern Germany (*q.v.*). The hist. of the war between France and Great Britain is to be found under CANADA and INDIA. See Frederick II., *Histoire de la guerre de sept ans*, 1788; R. Schmitt, *Prinz Heinrich von Preussen als Feldherr im Siebenjährigen Krieg*, 1885-97; J. Corbett, *England in the Seven Years War*, 1907; and R. A. Hall, *Frederick the Great and his Seven Years War*, 1918.

Severalty. In real property law, a freehold estate in S. is that which the tenant holds in his own right, without being joined in interest with any other person. It is thus distinguished from joint tenancy (*q.v.*), coparcenary (see COPARCENERS), and common tenancy (*q.v.*). In all of which cases two or more tenants hold the same land at the same time in community.

Severini, Gino (b. 1883), It. painter, b. at Cortona. Originally a Futurist, he later turned to Classicism. He has written *Du Cubisme au Classicisme* (1921). See studies by P. Courthion, 1930 and J. Cassou, 1933.

Severinus, Saint (d. 576), E. hermit who evangelised Noricum (the modern Austria). Sev. monastic foundations, particularly one near Vienna, were estab. by him. The Benedictine monastery at San Severino near Naples enshrines his relics; the church of St. S. in Cologne was destroyed in the Second World War.

Severn: 1. Riv. of England, rises on the slopes of Plynlimmon in Wales. It intersects Montgomeryshire, and enters Shropshire near the Brythen Hills where it becomes navigable. It then flows through Worcester-shire and Gloucestershire, widening considerably at Newnham, its waters thenceforth forming a long estuary to the Bristol Channel. Length 210 m. The tms. of Llandiloes, Newtown, Welshpool, Shrewsbury, Bridgnorth, Bewdley, Worcester, Upton, Tewkesbury, Gloucester, and Newnham are on its banks, and it receives the waters of the Teme, Usk, Stour, Wye, Vrynwy, Tern, and the Avon. By a fine system of canalisation, the riv. is connected with the Thames, the Dee, the Trent, and the Mersey. The Severn tunnel (completed in 1886 at a cost of £2,000,000) runs beneath the S. from New Passage to Portskewett, is 4½ m. long, and runs beneath the bed of the riv. for a distance of 2½ m. It is the longest tunnel in Britain. Vessels drawing 16 ft. of water can ascend to Gloucester by the Gloucester and Berkeley ship canal, while barges can reach Welshpool. The drainage area is about 6800 sq. m. The riv. flows rapidly in the reaches below Newnham, and is subject to a tidal wave about 5 ft. in height, which is dangerous to small craft. In 1947 the Ministry of Transport authorised the construction of a road bridge between Beachley and Aust, which will be the largest suspension bridge in Europe, and the third largest in the world. Its central span will be 3000 ft. It will have two side spans, each of 1000 ft., and the vertical clearance for shipping will be 110 ft. above high-water near the towers and about 120 ft. in the centre. The bridge will have two carriage ways, each 24 ft. wide, two cycle tracks, and two footpaths. The cost is estimated at £9,000,000. In 1933 a committee recommended the building of a hydro-electric power plant to utilise the S. tides by a barrage at the Eng. Stones reef. An engineering panel reported in 1945 that this was a practicable scheme; the cost would be £17,000,000, and 2,190,000,000 kWh. would be produced. See B. Waters, *Severn Tide*, 1947, and *Severn Stream*, 1949. 2. Riv. of Ontario, Canada, flowing into Hudson Bay; at its mouth is Fort S., one of the ports of the Hudson's Bay Company.

Severo, Cape, see CHILLYUSKIN.

Severus, Lucius Septimius (A.D. 146-211), Rom. emperor, b. near Leptis Magna in Africa. He obtained the questorship and a seat in the Senate in 172, and rose to the rank of praetor by 178. He went, a *legatus iuridicus*, to Hispania Citerior, became governor in succession of Pannonia and Illyria, and attained consular rank about 185. After the murder of Pertinax (193), being proclaimed emperor at Carnuntum, S. marched on Rome

and defeated and killed his rival, Pescennius Niger, at Issus (194). Two years later he defeated Clodius Albinus near Lyons. S. subdued the Parthians (198-200), and suppressed a revolt in Britain, where he founded Eboracum (York) in 211.

Severus, Marcus Aurelius Alexander, see ALEXANDER SEVERUS.

Séguigné, Marie de Rabutin-Chantal, Marquise de (1626-96), Fr. letter-writer, b. in Paris. The Abbé de Coulanges gave her a good education. In 1844 she married the Marquis de S., her unhappy married life being terminated in 1651 by the death of her husband in a duel. Thenceforth she devoted herself entirely



MARIE DE SÉGUIGNÉ

to her children, and it is to her affectionate care for her daughter that we owe the greater part of that collection of letters (*Letters to her Daughter, the Countess de Griignan*, Eng. trans., 8 vols., 1760-65) upon which the fame of Madame de S. is based; also M. de Monmerqué's ed., (12 vols. text and notes, 2 vols. lexicon, and an album of plates) (1862-68). See lives by J. Rubenais, 1842; G. Boissier, 1887; E. Laguet, 1910; A. Hallays, 1921; J. Lemoine, 1926; and C. Gazier, 1931. See also M. Montigny, *En voyageant avec Mme de Séguigné*, 1920; H. Glarié, *Mme de Séguigné, sa famille et ses amis*, 1925; and A. Stanley, *Mme de Séguigné, her Letters and her World*, 1916.

Seville: 1. Prov. of S.W. Spain, part of the older prov. of Andalusia, which was divided up in 1833. It stretches from the Sierra Morena Mts. on the W. to the Sierra de Gibráldin on the E. The prin. riv. is the Guadalquivir with its tribs., the Genil, Guadaira, and Guadalmar; it is navigable and divides the hilly dist. on the W. from the more fertile plains to the E. Agriculture flourishes, and cattle are

reared in considerable numbers; fruit, wheat, and barley are the main crops. The prov. is famous for its oranges, also for wool, silk, oil, and wine. It also has rich mineral products, copper, iron, and manganese being found. The prin. tns. are Seville, the cap., Ecija, Osuna, Carmona, Moron de la Frontera, and Utrera. Area 5430 sq. m. Pop. 1,081,800. 2. City, and cap. of the above prov., and the prin. port on the Guadalquivir, 60 m. N.N.E. of Cadiz. It lies in the valley of the riv., which has been extensively drained by artificial means. The cathedral of S. is one of the most beautiful churches in the world; it is dedicated to St. Maria de la Sede, is of immense size, and of Sp. Gothic architecture. It dates from 1402, but was not finished until 1519, and considerable additions have been made since. The clustered columns, the marble floor, and stained-glass windows are famous, and the great Aldejar tower is a survival of the time when S. was a Moorish kingdom. Another relic of the Moors is the beautiful palace, the Alcázar. Other buildings include churches, the univ., the archbishop's palace, S. being an archiepiscopal see, the exchange, and many other places of considerable interest. The city is an important port and trading centre; the prin. exports are wines, fruits (especially oranges), oil, cork, copper, and lead; and the imports coal, manufactured goods, ironwork, and tobacco. The prin. manufs. are machinery, liqueurs and brandies, porcelain, silks, perfumes, soap, tobacco, and chocolate. The artillery works and iron foundries also employ numbers of people. S. was known to the Phoenicians as Iispal, was a Rom. colony, and was taken by Julius Caesar in 45 B.C. It was the cap. of the Vandals' Sp. kingdom. From 712 until 1248 it was cap. of a Moorish kingdom; it was then conquered by Ferdinand III., became cap. of Castile for a time, and later of Andalusia. It was a centre for the Amer. trade in the sixteenth and seventeenth centuries, especially for the import of silver. Pop. 275,000. See W. M. Gallician, *The Story of Seville* (Medieval Towns series), 1903; A. F. Calvert, *Seville*, 1907; E. A. Peers, *Royal Seville*, 1926; and Hazafias y la Itua, *Historia de Seville*, 1931; and N. George, *Processions de Seville*, 1935.

Sèvre-Nantaise, La, Fr. riv., which rises at the foot of the Poitou hills, and flows into the l. b. of the Loire at Nantes. Its length is 78 m.

Sèvre-Niortaise, La, Fr. riv., which rises in the dept. of Deux-Sèvres, and flows into the Atlantic. Its length is 93 m.

Sèvres, tn. of France, in the dept. of Seine-et-Oise, 6 m. S.W. of Paris. It has been noted since 1756 for its fine porcelain, mosaic work, and painted glass. Here is an interesting museum containing many examples of pottery. Pop. 15,200.

Sèvres, Deux-, W. dept. of France, divided into three arrons.: Niort, Bressuire, and Parthenay. In the N., centre, and W. the country is marshy, though in parts it has been well drained, while the S. consists of a limestone plain. The prin. rivs. are the Sèvre-Niortaise (q.v.),

and the Sèvre-Nantaise (*q.v.*). The N. dist. is known as the Gâtine. The cap. is Nîort. Grain is grown in the south and S.E., also beet and forage crops, and in the W. hemp is grown. In some parts wine is produced. Owing to the large tracts of marshland, wild fowl abound. Horses are bred, and the dept. is famous for a special breed of mules. Cloth and woollens are manufactured, and there are coal-mines. The area is 2337 sq. m. Pop. about (1936) 308,400.

Sèvres, Treaty of, concluded between the Allies and Turkey in an attempt to settle the affairs of the Near E., signed on Aug. 10, 1920. The T. of S. imposed penalties on Turkey which were not borne by that country. The treaty was not ratified, and lapsed, Turkey arriving, after a war with Greece, at more advantageous terms contained in the treaty of Lausanne, July 1923. The chief aim of the T. of S. was to fix the boundaries of Turkey, allowing for the independent kingdom of the Hedjaz, and depriving Turkey of all control in Armenia, Thrace, Syria, Mesopotamia, and Palestine, while Greece was granted the sovereignty of the Aegean Isles, except the Dodecanese, allotted to Italy. In lieu of reparations an allied financial commission was to be placed in almost complete control of Turkey's finances and the port of Constantinople was also to be under allied control. See H. W. Temperley, *History of the Peace Conference at Paris*, vol. vi., 1923.

Sewage, contents of sewers, being foul water discharged from premises or any admixture of such foul water with surface water, i.e. water from roofs, etc. S. includes domestic S. and trade effluent, the latter being any liquid from a factory, other than domestic S. or surface- or storm-water, or any liquid from a manufacturing process.

Sewerage.—Public sewerage originated in the improvement and culverting of the open ditches which at one time served for the drainage of streets, etc., and became the natural recipients of all manner of household filth. When the provision of water supplies and the installation of water-closets led to the discharge of large quantities of S. to cesspools, the overflow of these cesspools to the sewers was at first prohibited, later permitted, and finally, discharge of soil S. to the sewers became obligatory. Thus grew up the combined system of sewerage which is in use at the present time in many places.

There are three systems of sewerage: the combined system in which one system of sewers receives both the foul S. from premises and the rainfall run-off from all roofs, roads, and other surfaces; the separate system, in which there are two systems of sewers, one to take the soil S. and deliver it to the S. treatment works, the other to deliver comparatively clean surface water to the nearest point of outfall into a natural watercourse, etc.; and the partially separate system, which is, in fact, a separate system except that, by permission of the local authority, surface drainage from parts of premises, e.g. the

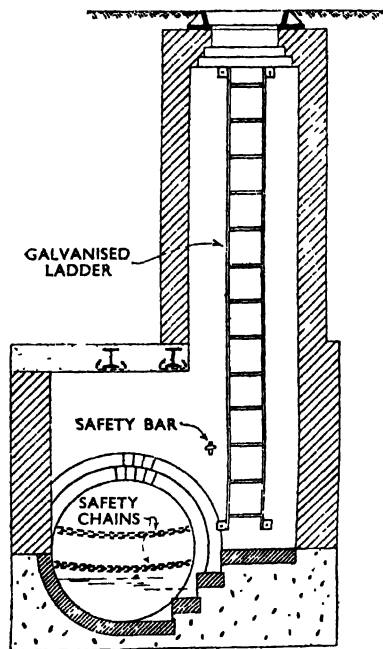
backyards and roofs of houses, is discharged to soil sewers.

The Public Health Act, 1936, defines drains and sewers as follows: 'Drain means a drain used for the drainage of one building or of any buildings or yards appurtenant to buildings within the same curtilage. Sewer does not include a drain as defined . . . but includes all sewers and drains used for the drainage of buildings and yards appurtenant to buildings.'

Sewers are public or private according to whether or not they are vested in the local authority. Local authorities are responsible for the proper drainage of their dist., and the owners or occupiers of premises have the right to discharge foul water and surface water to the public sewers; but this right does not entitle any person to discharge into the public sewer (a) any liquid from a factory, other than domestic S. or surface or storm-water, or any liquid from a manufacturing process; or (b) any liquid or other matter the discharge of which into public sewers is prohibited by any enactment, including the Public Health Act 1936 itself, which makes it an offence to pass into the public sewer (i.) any matter likely to injure the sewer or drain or interfere with the flow or S. treatment; (ii.) any chemical refuse or waste steam or any liquid so heated as to cause damage or a nuisance or be prejudicial to health; (iii.) any petroleum spirit or carbide of calcium; or (c) where separate public sewers are provided for foul water and for surface water, to discharge foul water into a sewer provided for surface water, or (except with the approval of the authority) surface water into a sewer provided for foul water. It is further provided that a person may not connect with a storm-water overflow sewer.

Although sewers are now closed pipes, they are still designed hydraulically as if they were open watercourses and, generally, pressure or surcharge is not permitted: each pipe slopes in the direction of flow at a gradient calculated to produce a velocity that will prevent silting (i.e. in the region of 2½ ft. per sec.), and each sewer is so sized that it will take the maximum flow to be allowed for according to recognised practice. The quantity of foul S. is usually taken as being slightly in excess of the local water demand by virtue of infiltration; and as the water demand rises to a peak somewhat before midday, when the flow is two or more times the average, and there are daily and seasonal variations, sewers are designed to take more than the average daily flow. The allowance made varies from twice to six times the average daily flow, four times being now perhaps the most usual. The daily amounts of soil S. vary considerably from one tn. to another, but average between thirty and thirty-five gallons per head of pop. per day, including trade wastes. Surface-water sewers have to be considerably larger than soil sewers. Their capacities are now usually calculated in accordance with the Lloyd-Davies method, in which it is assumed that the run-off to be allowed for is that of a storm

the duration of which is equal to the time taken for the water to flow from the most distant part of the sewerage system to the point at which flow is desired to be known. Sewers are not made to take the most intense storm likely to occur but, in Great Britain, storms as above described, and likely to occur once a year, are considered sufficiently intense to serve as the basis of sewer calculations, it being assumed that



MANHOLE ON LARGE SEWER

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more intense storms of infrequent occurrence will be accommodated by surcharge of the sewers.

Sewers are usually circular in cross-section and the smaller sizes are constructed of pipes of salt-glazed ware, pre-cast concrete, and cast-iron. Pipes are also used for medium-sized sewers, although, for these, materials suitable for large-sized sewers can be used. Large sewers are constructed of brickwork, brickwork backed with concrete, mass concrete, reinforced concrete, and pre-cast concrete segments and cast-iron segments lined with concrete or brickwork. Small sewers not exceeding 30 in. in internal diameter are laid in straight lines between manholes, which must be not more than

360 ft. apart. Larger sewers may be curved between manholes, but the maximum distance apart is maintained. Manholes are means of access to sewers, for inspection, cleansing, and repair, and consist of shafts and chambers of brickwork, mass concrete or pre-cast concrete pipes, more rarely, cast-iron or reinforced concrete. Manholes in roads are covered by heavy cast-iron manhole covers.

Sewers are ventilated for the purpose of removing poisonous, explosive, and corrosive gases produced by decomposition, the improper discharge of petrol or certain trade wastes, and the infiltration of coal-gas or natural gases from the ground. In areas where there are no intercepting traps between the drains of premises and the public sewers, ventilation is provided by the ventilating soil pipes of buildings. Elsewhere ventilating columns are provided at the top ends of all branch sewers and ventilating manhole covers used where they will not cause nuisance.

Sewers which receive little flow, or which are unavoidably laid to slack gradients are provided with means for flushing by automatic or hand-operated flushing tanks. An effective capacity of a flushing tank is in the region of one-tenth of the total cubic capacity of the length of sewer to be flushed. As far as practicable, S. is made to gravitate all the way from the point of entry to the sewerage system to the point of outfall, but in many cases S. pumping stations have to be provided. S. pumping can add considerably to the cost on the rates.

Sewage Disposal. On the sea-coast it is possible to discharge S. into the sea without treatment, or with such precautions as partial treatment by settlement of solids, or storage of S. and discharging it at certain stages of the tide, which may be necessary to avoid the fouling of beaches, etc. Inland, all S. must be treated before discharge to natural waters, so as to avoid the asphyxiation of fish, and nuisance generally. When S. is discharged without treatment it decomposes, depleting the natural water of its oxygen content, thus destroying fish life; moreover, further decomposition in oxygen-free water produces noxious gases.

Methods of S. treatment usually consist of preliminary removal of suspended solids with the aid of screens and sedimentation tanks. This is followed by the main process of oxidation of the remaining organic content with the aid of bacteria and other organisms. The treated S. is finally settled to remove solids produced during aeration before discharge to natural waters. Three types of aeration are in use. Land treatment, by surface irrigation (on heavy soils), and land filtration (on light soils), which was at one time general, is now becoming comparatively rare. By far the greater number of municipal S. works incorporate percolating-filter treatment, which is the aeration of S. as it trickles through a bed of clinker, coke, broken stone, or other suitable medium. The S. is distributed over the surface of the bed by a revolving or travelling sparge and afterwards collected and settled in

humus tanks to remove the organic debris produced in the bed.

The activated sludge methods of S. treatment are largely used. These include the proprietary processes of the diffused air method (Activated Sludge Limited) and the Simplex surface aeration system (Ames Crosta Mills and Company, Ltd.). In all these methods aeration takes place in aeration tanks or channels where S. is brought into contact with a suspended floc of bacteria and other organisms which effect the oxidation. The oxygen content of the S. is maintained by diffusion of air-bubbles through the mass of S. in the tank or by stirring and agitation of the surface. The effluent from the aeration tanks is settled in final sedimentation tanks to remove the activated sludge, part of which is returned for re-use in the process, and part of which is disposed, together with the crude sludge of the preliminary process.

S. sludge is disposed at most works by drying on open-air sludge-drying beds or, more rarely, by pressing in filter presses. Other methods (e.g. dumping at sea) are also used. Prior to drying, the quantity of sludge can be reduced by digestion of the organic content in digestion tanks. This process may take place at day temp., but is facilitated by heating the sludge to a temp. of about 55° F. Not only does this reduce the quantity of sludge, but it renders the sludge inoffensive and more suitable for agric. uses. The gas produced by the digestion has a high calorific value, and is frequently utilised for power purposes at the S. works, and for heating the sludge in the process. S. sludge is a manure of comparatively low value, and sometimes it contains injurious substances. Good quality manure can be produced at S. works, but at greater cost than is normally justified. See also PUBLIC HEALTH; REFUSE DISPOSAL; SANITATION OF BUILDINGS. See L. Motenalt and H. P. Eddy, *American Sewerage Practice*, 1928, and L. B. Escriott and S. F. Rich, *The Work of the Sanitary Engineer*, 1949.

Seward, Anna (1747-1809), Eng. authoress, b. at Eyam, in Derbyshire, commonly called the 'Swan of Lichfield,' wrote poems, the earliest of which appeared in the *Bathaston Miscellany*. Among her books was *Memoirs of the Life of Dr. Darwin* (1804). Scott ed. her posthumous works and her poems (1810), and Constable in 1811 issued 6 vols. of her letters, a selection of which, ed. by H. Pearson as *The Swan of Lichfield*, was pub. in 1936. See E. V. Lucas, *A Swan and her Friends*, 1909, and M. Ashmun, *The Singing Swan*, 1931.

Seward, William Henry (1801-72), Amer. statesman, b. at Florida, Orange co., New York. He graduated at Union College, 1820, and was admitted to the Bar in 1822. In 1830 he was elected to the New York state senate as an anti-Masonic candidate, and in 1838 was elected Whig governor of New York and re-elected in 1840. S.'s policy was exceptionally humane, and later he became one of the leaders of the anti-slavery Whigs. As U.S. senator from New York

state, in 1850 he made a famous speech against the fugitive slave laws; his doctrine being that no gov. could change the moral convictions of the people by law, and that there was a higher law even than the constitution. Overriding any tendency that he might previously have had to steer a middle course between the inflexible policy of Lincoln and any compromise over the 'right' of secession, he justified Lincoln's confidence in him by telling the people that the end of slavery in the U.S.A. was inevitable. This speech made him the chosen leader in the N. on this crusade. He refused to try for the nomination for the presidency when the Republican party held its first national convention in 1856. In 1861, however, his name was put forward, but Lincoln was nominated on the third ballot after New England delegates deserted. Lincoln made him secretary of state in 1861. He was attacked by an accomplice of J. Wilkes Booth on April 14, 1865, at the same time that Lincoln was assassinated. S. was severely stabbed, but recovered and remained in the Cabinet under President Johnson, whom he influenced to pursue the mild policy towards the S. which Lincoln had contemplated. As secretary of state, when the Civil war was ended, he peremptorily demanded that Napoleon III. should remove his troops from Mexico, and at the same time Gen. Sheridan was sent to the Texas border with 50,000 veteran soldiers; the Fr. forces were speedily withdrawn. In 1867 he concluded the purchase of Alaska from Russia. See life by F. Bancroft, 1900, and also F. W. Seward, *Recollections of a Wartime Statesman and Diplomat*, 1916.

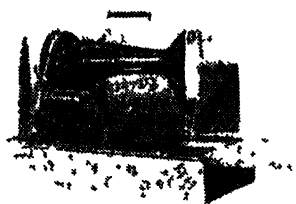
Sewell, Anna (1820-78), Eng. authoress, b. at Great Yarmouth, Norfolk. Her mother, Mary (Wright) S., was herself an authoress, but the lives of the S. family were clouded by poverty. An accident in Anna's childhood left her a cripple for life. Her only book, *Black Beauty: the Autobiography of a Horse*, a children's classic of perennial charm, was pub. in 1877 (Everyman's Library ed., 1921).

Sewerage, see under SEWAGE.

Sewers, see under SEWAGE.

Sewing-machine. The present-day S. is practically the result of constant improvements on and modifications of Singer's machines, as patented by Isaac M. Singer in 1851. This patent, however, was anticipated by Elias Howe (q.r.) of Spencer, Massachusetts, U.S.A., who, after numerous vicissitudes, finally broke down all opposition to his patents, including that of Singer, and received enormous sums from royalties prior to his death in 1867. His was the first patented lock-stitch machine, although he was not aware that an almost identical machine had been constructed about 1834 by Walter Hunt of New York, embodying as essential features a curved needle having the eye in its point, and an oscillating shuttle beneath, passing a second thread through the loop of a first thread left under the fabric by the needle, thus forming a lock-stitch, essentially the same as modern machines. Prior to this were machines by Barthélemy Thimonnier

and Thomas Saint. The former took out a Fr patent in 1830 for a chain stitch machine using a crocheted needle which, passing through the fabric left a loop on the surface and returning brought up a loop which it carried through the first. The latter patented a machine in 1790 used chiefly for leather work. This machine comprised a piercer which made a hole through the leather and a forked needle pushed the thread through a loop previously laid over the hole thus again making a chain stitch. It is curious to note that a combination of this piercer and needle (an eyeless joint) would have advanced the art of sewing by machinery some forty or fifty years since as indicated Hunt's and Howe's machines were the pioneers of the needle having an eye through its point. Both Thimnier's and Saint's machines used a single thread in contrast to the two threads of later machines. The chief types now in use



LITHIC SLOWING MACHINE

are all of Amer origin and include the rotary hook invented by A. B. Wilson and the reciprocating and the oscillating shuttles of Singer. The chain stitch has the disadvantage that on pulling the thread the whole seam will too readily come apart. The double chain stitch is elaborate uses an unnecessary amount of thread, and forms a hard ridge on the cloth all of which are objectionable. It is however used extensively in the hosiery industry. The overlock machine is also used for sewing hosiery. It uses two or three threads which interlock and form an elastic seam. Speeds of 5500 stitches per min are obtained from these machines. The lock stitch is at once the simplest and practically perfect device. The design of the S usually conforms to the familiar right angled frame and casing. Through the horizontal upper arm passes a spindle or shaft which operates the vertical needle holder, and a connecting rod through the vertical arm operates the mechanism which transmits the necessary motion to the shuttle under the needle. The whole is worked by hand foot or electric power in domestic machines but chiefly by power for industrial purposes, although the two classes of machines are essentially the same.

There are for various trades many other varieties of machines for purposes other

than light cloth work. They are used in the manuf of boots and shoes, paper books, heavy leather belts, leather goods, gloves (both textile and leather), mattresses and any manufactured goods requiring stitching. Some machines stitch and turn simultaneously. There are also machines for sewing with steel wire for cuplets and the like the machines are caused to travel along the fabric owing to the difficulty of feeding such heavy articles under the needle. There are also interesting modifications of distinct pattern, such as for belt joints where a circular or helical coil needle is used for piercing the holes in each end of a belt, which is followed up by a wire coil inserted through the holes. The wire loops so formed are elongated the ends of the belt brought together and after overlapping the loops a gut pin is passed through them, making a hinged joint. See also EMBROIDERY Machine Embroidery. See L. Newton *A Servant in the House History of the Sewing Machine* 1929.

Sex, see BIOLOGY, HEREDITY, IMPOSSIBLE MARRIAGE, REPRODUCTION also under PSYCHOANALYSIS.

Sex Determination. In a few animals, such as the garden snail the earthworm, and the freshwater hydræ, the male and female sexes are combined in one individual which is said to be hermaphrodite. The oyster is hermaphrodite and protandrous i.e. each individual is first male producing sperm, and then female, laying eggs (the ship clammet (*repudula*) exists as chains of individuals each starting as a male and later changing into a female. Most animals however have separate male and female sexes though occasional hermaphrodite individuals may occur as exceptions. In the worm like *Tomothia viridis* sex is apparently determined by the environment: those larvae which develop independently become females whereas those which become attached to adult females themselves develop into males. The normal method of sex determination is by the distribution of the sex chromosomes which are of two kinds, X and Y. The female has two X chromosomes i.e. XX in the nuclei of the body cells as well as a certain number of pairs of ordinary chromosomes (autosomes), the male has one X and one Y, i.e. XY, together with the same number of autosomes as the female. The Y chromosome is in the nature of a dummy and it may be completely absent as is the case, for instance in humans, where the male has forty seven chromosomes i.e. forty six autosomes + X whereas the female has forty eight chromosomes i.e. forty six autosomes + XX. During the maturation of the gametes (sperms or eggs) the pairs of chromosomes separate, so that the total number is halved: each egg receives one X chromosome, whilst approximately half the sperms receive X and half receive Y (or if X is absent then half the sperms have X and half are without either X or Y). Approximately half the eggs will be fertilized by X sperms, each resulting zygote (fertilized egg) will have XX and will develop into a female individual. The

remaining eggs (approximately 50 per cent) will be fertilised by Y sperms, so that each zygote will have XY, and will become a male. In this way the numbers of males and females in the offspring are maintained approximately equal.

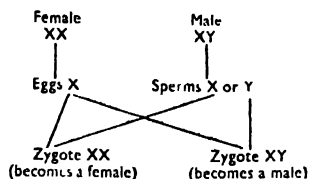


DIAGRAM TO SHOW HOW SEX IS DETERMINED BY THE SEX CHROMOSOMES

It will be noted that the sperms are of two kinds (X sperms, or female-producing, and Y sperms, or male-producing). Artificial insemination (*q.v.*) with one or the other kind, if they could be isolated from one another, would enable the sex of the offspring to be controlled at will. It is perhaps fortunate for the human race that such separation of X and Y sperms has not yet been achieved, though it would be useful in the breeding of farm animals. Any other methods which are sometimes regarded as exerting a possible influence on sex are certainly of no value. In some animals, namely birds, butterflies and moths, caddis flies, and certain fishes, the above arrangement of sex chromosomes is reversed: the male is XX and the female XY. In honey bees each egg follows the usual rule, and has X; each sperm has X also. A fertilised egg has XX, and becomes a female (queen or worker); an unfertilised egg has X, and develops parthenogenetically into a male (drone).

Sex Linkage.—Certain characteristics which are much commoner in one sex than the other are 'sex linked.' A well-known example is the tortoiseshell coloration of cats, occurring almost always in females. Colour blindness, night blindness, and hæmophilia (bleeding disease) are all commoner in male humans than in female, though females can act as carriers, and pass on the defect to the next generation. These facts can be explained by postulating that the characters in question are transmitted by the sex chromosomes. Thus the human defects mentioned behave as Mendelian recessives transmitted by the X chromosome; a male 'bleeder,' for instance, would be X'Y (or X' alone), and a female carrier, X'X (where X is a normal sex chromosome and X' is one responsible for the defect); a female 'bleeder' could arise only from a cross between a male bleeder and a female carrier, by a union of X' from the male and X' from the female, and is therefore very rare.

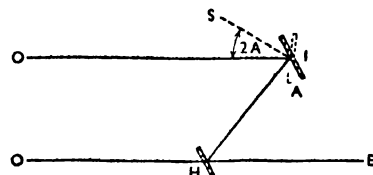
Another feature of sex linkage is the 'criss-cross' inheritance which occurs, for instance, in poultry when a 'barred' (striped) Plymouth Rock hen is crossed with a black cock of the same breed. The offspring consist of barred cocks and black

hens; moreover, the difference in colouring is obvious in the chicks, so that the sexes can be distinguished even at this early stage, a most useful feature to the breeder. 'Autosexing' breeds of fowls have also recently been evolved. See also BREEDING; MENDELISM. See K. C. Punnett, *Heredity in Poultry*, 1923, and *Mendelism* (7th ed.), 1927; F. A. E. Crew, *Sex Determination*, 1933; and E. B. Ford, *Genetics for Medical Students* (2nd ed.), 1945.

Sexagesima, second Sunday before Lent, or eighth before Easter.

Sextant, instrument used primarily for navigational purposes at sea. It derives its name from its shape, the sixth part of a circle (Lat. *sextus*). The invention of the instrument is commonly attributed to the Englishman, John Hadley, about 1730. Prior to this all instruments used for measuring the angular distance between two objects, suffered from the disadvantage that they had to be kept stationary while taking sights, a difficult operation in a ship which is rolling and pitching. With the advent of the S. this great disadvantage has disappeared, since two readings obtained are independent of the position of the instrument within certain limits, and the S. may therefore be held in the hand for the taking of sights.

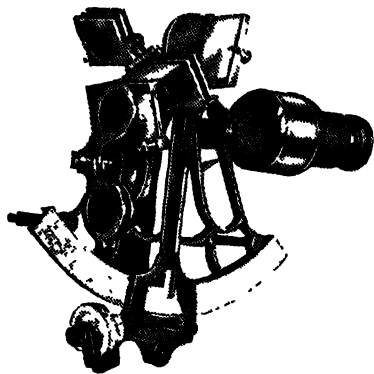
The theory of the S. is shown in the diagram. It is a fixed mirror called the horizon glass, which is silvered over half its surface, and left clear over the remainder. I is another mirror (called the index glass), which is silvered all over, and is capable of rotation about its centre. When I is parallel to H, rays from a distant object O which traverse the path OHIE are seen by the eye at E to be coincident with rays which have taken the direct path OHIE through the clear portion of the mirror H. Now by one of the laws of optics the angle between the incident and doubly reflected rays in a combination such as this, is twice the angle between the mirrors; thus if the mirror I is turned through the angle A into the position shown dotted, coincidence will be made at the eye between O direct and an object S by reflection where $\angle OIS = 2A$. If, therefore, mirror I is fixed to an index arm which moves over a circle graduated in half degrees figured as degrees, the angle



between S and O may be read off directly in degrees.

In practice the S. consists of a gunmetal frame (or if lightness is required, an aluminium alloy is used) in the form of a sector of a circle, which carries the rotatable mirror I (at the centre of the circle), the fixed horizon mirror H, and a bracket

into which either a high-power inverting telescope (for sun observation) or a low-power night glass of large aperture (for star observation) may be fitted as required. In the modern S. angles are read by means of a micrometer, which acts on the worm and rack principle. A rack in the form of a circular arc, with teeth at half-degree intervals, is cut very accurately on the S. frame, and the engaging worm, which carries the micrometer drum, is fitted to the index arm on which the index mirror is mounted. The micrometer worm can be lifted out of engagement with the rack, and may be re-engaged at any desired angle. The micrometer drum is divided into sixty parts corresponding to minutes of arc, and these are further subdivided to read to 10 or 12 sec. by means of a vernier.



Heath & Co.

'HEZZANITH' MARK 'A' 'NUBEL', SEXTANT

Three hinged shades of coloured glass are fitted to control the brightness of the direct rays, and four shades, including a very dense one for sun observation, are used to control the brightness of the reflected beam. All parts of the S. must be very accurately made, and the instrument is very carefully adjusted during manufacture; adjusting screws are provided on the horizon and index mirrors to enable the user to correct any errors which may be introduced by the S. getting out of adjustment in course of time. With the best-quality S. various accessories are supplied, such as electrical lighting, elliptical lens, and Wollaston prism, chiefly for assistance in star observation.

The bubble S. is a specialised form of S. for use when the horizon is not visible; it employs the basic principles of the S., and is fitted with a circular level bubble which denotes a horizontal direction from which vertical angles may be measured. The box S. is a small, compact, and simplified form of instrument largely used by surveyors. See G. A. Heath, *My Modern Sextant*, and H. J. Cooper (ed.), *Scientific Instruments* (chap. xxii.), 1946.

Sexton, officer of the church whose name is a contraction of sacristan. After the

reformation the sacristan's duties almost disappeared, and the S. has declined into a person who prepares the graves, sweeps the church, and performs similar menial offices.

Sexual Selection, term used by Darwin to account for the existence of secondary sex characters. The two methods of S. S. are (1) combat among the males, and (2) preferential mating where the female chooses her mate. It is really an extension of the theory of natural selection. In the first of the two methods the result is clearly in aid of selection; for if the younger and weaker males be killed, expelled, or otherwise left unmated, then the offspring will be more vigorous. To carry it still further, the stronger and more vigorous males will select the stronger and more vigorous females, with the result that they will breed a larger number of offspring, which will be also much stronger and more vigorous than the offspring of the less strong and vigorous males and females. The case for preferential mating is not so easy. Males undoubtedly in many species do endeavour to attract the female by showing off their attractions of plumage, song, etc. Darwin, on the one hand, maintained that the female often does choose from among her suitors, not deliberately, but because attracted or excited by their display. Wallace, on the other hand, denied that there is any great evidence of choice, and still less that it is because of any excellence in the male. Thus Darwin held that the colouring, song, etc., of birds and insects are due to persistent choice of the female of mates who are most beautiful, or are the sweetest songsters. Wallace, however, held that the plain plumage of the female, or its lack of song, is a result of natural selection, and is necessary for the preservation of the race, the colouring and lack of song being protective. See also BIOLOGY; DARWINISM or the DARWINIAN THEORY; EVOLUTION. See C. Darwin, *Descent of Man*, 1871; P. Geddes and J. A. Thomson, *Evolution of Sex*, 1889; and J. Rostand, *Problèmes de l'hérédité*, 1933.

Seychelles, archipelago in the Indian Ocean, consisting of, in all, 101 is., with a total area of 156 sq. m.; situated N.E. of Madagascar, between 3° 38' and 5° 45' S., and 52° 55' and 53° 50' E.; Mahé is the largest and Praslin the second largest of the is. Mahé rises abruptly from the sea, and the highest peak reaches the height of 2990 ft. The next largest are, respectively, Silhouette, Curieuse, La Digue, and Frigate. In 1922 the Farquhar Is. were annexed to the colony. The cap, and chief port of the group is Victoria, on Mahé. It is situated in a valley, and has a safe and commodious harbour, provided with a lighthouse. The climate is healthy; temp. moderate. Coco-nuts, cinnamon, and essential oils are the chief products. The exports are copra, guano, essential oils, tortoise-shell, and vanilla. More especially in Praslin, though also in other parts of the group, is to be found the celebrated coco-de-mer, with the leaves of which beautiful hats and delicate basket-work are made by the natives.

The Aldabra group of is. is the habitat of the gigantic land tortoises, but many specimens are also found in Mahé.

The is. are supposed to have been discovered by a Portuguese, Pedro Mascarenhas, in 1505, but the discovery was not followed by any attempt at colonisation. They were captured by the Fr. in 1743, and by the Brit. in 1794 and finally ceded to Britain by the treaty of Paris (1814). Before the Fr. occupation they were the resort of pirates of the Indian Ocean, some of whose names are borne by descendants in Mahé to-day. Under the gov. at Mauritius of Labourdonnais, whose name the is. once bore, their position was first defined in 1743, and Picault took possession in the name of the king of France, calling the chief is. Mahé after Mahé de Labourdonnais. Later the group was renamed the S. in honour of Viscomte Moreau de Séchelles, controller-general of finance under Louis XV. During the Fr. revolution Mahé was used by Fr. ships as a place of refuge and refitment, but on May 17, 1794, it was captured by Capt. Newcome of H.M.S. *Orpheus*. The last Fr. governor, de Quincy, eventually became first *agent civil* under the Brit. Gov. It was not until the capture of Mauritius in 1810 that S. was formally incorporated as a dependency of that colony. In 1897 the administrator was given full powers as governor, and S. was practically separated from Mauritius. The separation was completed in 1903 by an Order in Council, constituting S. a separate colony under its own governor. During the Fr. occupation settlers, mostly from Mauritius, were placed on Mahé, and the descendants of these form the majority of the European and mixed element of the pop., whose language is Fr. Slaves were also brought in from Mauritius and this class, after the Brit. occupation, was much increased by the fact of S. being chosen as a refuge for African slaves freed by the Brit. Navy. Their descendants form to-day the large majority of the pop. All profess Christianity, being mostly of the Rom. Catholic faith. The colony was chosen in 1897 as the place of deportation of Prempeh, ex-king of Ashanti; in 1901 Mwanga, ex-king of Uganda and Kabarego, ex-king of Unyoro, and in 1937 the leaders of the Arab revolt in Palestine, were also deported thither. After the Second World War popular representation was introduced in a form of elected council, an attempt was made to break down colour discrimination, and social services were introduced. Pop. 35,000, only 3 per cent of whom are Europeans. See M. Murat, *Gordon's Eden, or the Seychelles Archipelago*, 1900; J. A. F. Ozanne, *Coronula and Creola*, 1936; and *Annual Report on the Seychelles*, 1948 (H.M.S.O.), 1949.

Seydlitz, Friedrich Wilhelm von (1721-1773), Prussian cavalry general, b. at Calcar, near Cleves; son of a cavalry captain of anc. noble Silesian descent. As a boy he was remarkable for feats of horsemanship. S. became a cornet in the margrave of Schwedt's cuirassiers, 1740, and was captain of hussars, 1743. He commanded the Württemberg dragoons, 1752,

and the Rochow cuirassiers, 1753, becoming colonel in 1755. He was the most brilliant cavalryman of the Seven Years war. Although he was wounded at Kunersdorf he soon returned to the army. In 1760 S. took part in the defence of Berlin against the Russians. In 1762 he again distinguished himself at Freiberg. After the making of peace he was transferred to the Silesian cavalry-inspection, and in 1767 made general. See *lives* by E. Buxbaum, 1907, and C. von Bredow, 1908.

Seyhan, see ADANA.

Seymour Family, see BEAUCHAMP and SOMERSET, DUKES OF.

Seymour, Frederick Beauchamp Paget, see ALCENTER, BARON.

Seymour, Hugh Seymour Conway, known as Lord Hugh Seymour (1759-1801), Brit. admiral. He was the fifth son of the marquess of Hertford, and at the relief of Gibraltar in 1782 he was in command of the *Latona*. During the three days' fighting ending in what is known as the 'glorious First of June' (1794) he greatly distinguished himself. He took part in the fighting off Lorient under Bridport, and held the post of lord of the Admiralty for three years (1796-99).

Seymour, Lady Jane (c. 1509-37), third wife of Henry VIII., and mother of Edward VI., b. at Wolf Hall, Savername, Wiltshire. She was at first maid of honour to Anne Boleyn, whom she supplanted in 1536. She died in 1537, a few days after giving birth to her son.

Seyne-sur-Mer, La, tn. in the dept. of Var, France, near Toulon. It is engaged in shipbuilding, and has steel-works. Pop. 26,100.

Seyss-Inquart, Arthur (1892-1946), Austrian lawyer and politician. b. in the Sudetenland, joined the Nazi party in 1928. He was minister of the Interior and security in the Schuschnigg cabinet from Feb. to March, 1938. He became governor of Austria in 1938, deputy-governor-general of Poland in 1939. As Reich commissioner for the Netherlands he was ruthless in applying terrorism to suppress opposition to the Ger. occupation. The Nuremberg tribunals found him guilty of all the above crimes, besides being a voluntary participant in crimes against humanity in Holland, and he was executed in 1946.

Slax, seaport on the gulf of Gabes, Tunis. Its chief articles of trade are cotton and woollen goods, oil, fruit, and phosphates. Pop. 14,000.

Sfondrato, Nicopló, see (GREGORY (popes), Gregory XIV.

Sforza, famous It. ducal family descended from Giacomo Sforza, or Muzio Attendolo (1369-1424), peasant condottiere who adopted the name of S. He was succeeded in command of the condottieri by his son Francesco (1401-86). He served Filippo Maria Visconti, duke of Milan, and in 1441 married his only daughter, Bianca. On Filippo's death (1447), Francesco defeated the Venetians, hereditary enemies of Milan, and was acknowledged duke of Milan in 1450. His rule was most beneficent. His son, Galeazzo Maria

(1444-76), who succeeded him in 1466, was a cruel and dissolute despot, and was assassinated. *Gian Galeazzo* (1469-94), son of Galeazzo Maria, succeeded to the duchy under his mother's regency, but was supplanted in 1481 by his uncle, *Lodovico*, surnamed *il Moro* (the Moor) (1451-1508). Lodovico seems to have poisoned Gian Galeazzo, and was betrayed by his own mercenaries in 1500, to Louis XII. of France, who kept him in captivity till his death. Other prominent members of the family were *Cardinal Ascanio*, son of Francesco; *Bona Sforza* (1493-1557), daughter of Gian Galeazzo and wife of the king of Poland; *Francesco* (d. 1511), son of Gian Galeazzo and abbot of Marmoutiers; *Masimiliano* (1490-1530), son of Lodovico, restored to the duchy in 1512, and his brother *Francesco Maria* (1492-1535), made duke by Charles V. in 1522. See G. Clausse, *Les Sforza et les arts en Milanais, 1450-1530*, 1909; F. Malaguzzi Valeri, *La corte di Lodovico il Moro*, 1913-1915; and L. Collinson-Morley, *The Story of the Sforzas*, 1933.

Sforza, Count Carlo (b. 1872), It. diplomat and statesman, b. at Montignoso di Lungiana (Massa). He had a distinguished diplomatic career at Constantinople, Peking, Paris, Madrid, and London. In 1919 he became under-secretary of state; in 1920 foreign minister under Giolitti. By this time he had the reputation of being one of the most brilliant of the new statesmen who were most active in the task of realising European peace, alike at the Supreme Allied Council and at the League of Nations. Above all, he gave It. foreign policy an unequivocal direction founded on the assumption, so unacceptable to the Fascists, that the Versailles settlement had given Italy her supreme chance, particularly as the dual monarchy, her age-old menace, had disappeared, and so left Italy free to take the lead in the troubled politics of central and N.E. Europe. In this period he made pacts with Rumania and Czechoslovakia, and concluded the treaty of Rapallo (1920) with Yugoslavia, thereby exercising the spectre of war with that country and satisfactorily settling the problem of Fiume (see also D'ANNUNZIO and RAPALLO, TREATY OF). This gained him the Collar of the Annunziata, the highest of It. honours, which made him a titular life-long adviser of the king. At the same time this was the cause of his downfall, owing to a secret clause in the treaty ceding a small port near Fiume to Yugoslavia—a revelation which, through the bitter hostility of the Fascists or Nationalists, brought about the fall of the gov. and his own resignation as It. ambas. at Paris. He then tried to organise opposition to Fascism in the Senate, but in vain, and by 1927 he had virtually exiled himself, first in France, and later in America, and for the ensuing twenty years he was out of office. In May 1940 he sent a memorandum to the king of Italy warning him against the folly of declaring war on Britain and France. He returned to Italy in 1943, and in his seventy-fifth year made a dramatic re-entry on the stage of

European diplomacy at the Paris Conference of 1947, once more being Italy's foreign minister. Among his pub. are *Fifty Years of War and Diplomacy in the Balkans* (trans. 1941); *Machiavelli: Latin and Italian* (trans. 1942); *The Real Italians* (1942); *Totalitarian War and After* (1942); *Contemporary Italy: its Intellectual and Moral Origins* (trans. 1946); and *Italy and the Italians* (trans. 1948).

Sgraffito (It., scratched work), form of house decoration which was very general in prehistoric times throughout the Mediterranean dist. and elsewhere, and which has been revived in central Italy and Switzerland since the fifteenth century. The wall is coloured black or dark brown, and then receives a coat of light plaster on which a design is traced so that the dark paint shows through. The modern practice in commercial art of executing black-and-white drawings by 'scraper-board' is based on the same principle, except that the scratching is performed on black on a base of white producing an effect similar to reproductions from wood engravings. See E. Benzer, *Fresco- und Sgraffito-technik*, 1909.

s'Gravenhage, see HAGUE, THE.

Shabats, see SABAT.

Shackleton, Sir Ernest Henry (1874-1922), Brit. Antarctic explorer, b. at Kilkeel, co. Kildare, eldest son of Henry S. M.D. He was educated at Dulwich College, and was third lieutenant in the National Antarctic Expedition, 1901. He

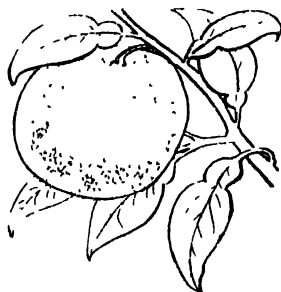


SIR ERNEST SHACKLETON

commanded the Brit. Antarctic expedition, 1908-9. On Jan. 1, 1908, his expedition left New Zealand in the *Nimrod*. He estab. a base near Mt. Erebus, whence, on Oct. 20, 1908, he started over the ice with sledges and in company with Lt. Adams, Dr. Eric Marshall, and Frank Wild (q.v.), with provisions for ninety-one days. By Nov. 26 they reached the point farthest S.

theretofore attained; and on Jan. 9, 1909, they reached the higher lat. $88^{\circ} 23' S$. One of the most interesting of their discoveries was that of coal at a lat. of 85° south. S. was presented with the special gold medal of the Royal Geographical Society. He was knighted on the king's birthday in the same year, and awarded a gov. grant of £20,000. In 1914-16 he intended to cross Antarctica from Coats Land to McMurdo Sound; but the section employed to lay depots perished; the ship *Endurance* was crushed in ice and abandoned; and the party endured great hardship on Elephant Is., and were only rescued after S. and five others had voyaged to South Georgia in a 22-ft. boat. In Sept. 1921 S. left London in the ship *Quest*, for a three years' tour in Antarctica. He died on board that ship, off South Georgia, Jun. 5, 1922. After being taken to Montevideo, his body was conveyed back, and, in accordance with his wish, buried in South Georgia. S. pub. accounts of his journeys in *The Heart of the Antarctic* (1909), and *South: the Story of Shackleton's Last Expedition, 1914-17* (1919). See lives by H. Begbie, 1922; H. R. Mill, 1923; F. Hurley, 1925; and F. Worsley, 1931.

Shaddock (*Citrus grandis* or *maxima*), tree allied to the orange-tree, bearing large white flower, followed by globose fruits with greenish-yellow skin. Sometimes they attain a weight of as much as 20 lb.



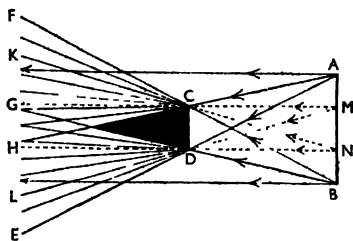
SHADDOCK

It is a native of S.E. Asia, and is extensively cultivated, particularly for the production of the somewhat smaller variety of fruit known as the grapefruit (*q.v.*), which has become popular in recent years in Britain.

Shadow Puppets, see under PUPPETS.

Shadows. Radiant energy travels in straight lines in the same medium, but certain substances are opaque to one form or another of the waves. On the lee side of such objects there is no manifestation of such energy and a shadow is formed. A radiant point would give a pyramidal shadow truncated by the object; a radiant surface, such as AB, representing a circular disk CD a cone of space in which no radiant energy would travel from any portion of AB; this is the true *umbra*. No rays from any point in the circle MN can travel

through the infinite cylinder CGHD; none from A can pass through the oblique truncated cone CHED. For any point in the radiant circle A there is always a truncated cone beyond CD which none of its rays can traverse; these cones are enveloped in the cone CDEK, and the region with the exception of the umbra is the *penumbra*.



Rain-shadow is the term which is applied to the area of smaller rainfall on the lee side of hills and mts. The effect has been noticed with even very low hills and belts of trees. The higher the obstacle the larger the shadow and the more efficient the diminishing of the rainfall. For the geometrical construction of projected S., see J. Harrison and G. A. Baxendall, *Practical Plane and Solid Geometry for Advanced Students*, 1899.

Shadwell, Thomas (1642-92). Eng. poet laureate and dramatist, b. at Santon Hall, Norfolk. He studied at Cambridge Univ. and brought out his first play, *The Sullen Lovers*, based on Molière's *Les Fâcheux*, at the theatre in Lincoln's Inn Fields in 1668. After other adaptations he wrote *Epsom Wells*, a coarse comedy but well constructed, which was successful at Dorset Garden in 1672. *The Squire of Alsatia* was presented in 1688 and *Bury Fair* in 1689. Among his other comedies, which show comic power and truth to nature, are *Royal Shepherdess* (1669), *The Humorists* (1671), and *The Miser* (1672). S. favoured the cause of the middle-class Whigs of the 17th c., and when Dryden attacked them in *Absalom and Achitophel* and *The Medal*, S. scurrilously assailed him in *The Medal of John Bayes* (1682). The punishment which his evoked in *MacFlecknoe* and the second part of *Absalom and Achitophel*, in which S. figures as 'Og', lent him an unenviable immortality. He may, however, have derived some consolation in his succession to Dryden as poet laureate when, at the revolution, the latter was deprived of his office. Owing to his feud with Dryden S. has been consistently underrated. He had comic powers of a high order, if counterbalanced by a certain heaviness and literary maladroitness; but later writers, including Scott and Macaulay in particular, relied upon his plays as pictures of contemporary life. See ed. of his works by G. Saintsbury, 1925, and M. Sumner (ed.), *The Complete Works of Thomas Shadwell*, 1927. See also E. Anmann, *Analysis of Thomas Shadwell's Lancashire Witches*, 1905, and

A S Borgman, *Thomas Shadwell his Life and Comedies* 1929

Shadwell, dist of London in the bor of Stepney, is 2 mi S E of St Paul's

Shaftesbury, Anthony Ashley Cooper, first Earl of (1621-83) son of Sir John Cooper, b at Wimborne St Giles, in Dorsetshire. He was entered at Exeter College, Oxford in 1636 but took no degree and in 1638 became a student of law at Lincoln's Inn. In his nineteenth year he was returned as one of the members for Tewkesbury to the Parliament which met in April 1640. He did not sit in the next the Long Parliament but he adhered to the royal interest till he was refused in 1643 the governorship of Weymouth put upon him by the marquis of Hertford. S's attitude now seemed to change completely and he went over to the parliamentarians whether motives other than the loss of the governorship determined this action is obscure.

S sat as one of the members for Wiltshire in the first (Bairdones) Parliament and by this Parliament or convention he was appointed one of the protector's council of state in which capacity it is affirmed that he offered strenuous opposition to Cromwell's designs. In the Convention Parliament which met April 20 1660 Sir Anthony Cooper (as he now was) was one of the select committee appointed to draw up the invitation to the new king and one of the commissioners sent over to Breida. At the restoration of Charles II Sir Anthony was made lord lieutenant of the co of Dorset chancellor of the Exchequer and a privy councillor and in 1661 he was raised to the peerage as Baron Ashley of Wimborne St Giles. After the fall of Clarendon Lord Ashley formed one of the Cabal Ministry. In April 1672 he was created earl of S and in Nov following was raised to the office of lord chancellor proving himself a most upright judge. In 1673 however he supported the Test Bill an action which had the result of breaking up the Cabal. He returned the seals of his office till Nov of the same year when he was dismissed no doubt by the influence of the duke of York and the popish party. On his dismissal from office S openly joined the ranks of opposition as a champion of toleration for dissenters and national liberties. He opposed Danby's non-resistance Bill (1675) and in 1677 was sent to the Tower for his protest against prorogation but was quickly released on making full submission. Though the 'Popish Plot' was not inspired by S he made use of the two years' terror of 1678-1680 most ruthlessly and even the Habeas Corpus Act for long known as Shaftesbury's Act, is no true extenuation of the execution of Lord Stafford his personal enemy.

After the fall of Danby S was made president of Temple's new Privy Council (1679), and he now tried to exclude James duke of York, from the succession in favour of Monmouth by presenting an indictment of the former as a Popish recusant (June 26, 1680). In the following year he was again sent to the Tower

on a charge of treason, but when an indictment was preferred against him at the Old Bailey the grand jury ignored it. When Monmouth and Lord Wm Russell refrained from the open rebellion advocated by S the latter evidently feeling that there was no safety for him in England fled to Holland Nov 18, 1682. He resided at Amsterdam until his death, a few months later.

An extremely able and eloquent S yet stands condemned by posterity for his obvious faults and especially for his dominant motive of self interest. He may be regarded as an originator of party government though he was always prone to score party advantages from plots, intrigues, perjuries and especially religious conflict. See lives by B Martin and A Kippis, 1836, W Christie 1871 and I F Brown, 1934. See also S Butler *Hudibras* (Part III), 1675; J Dryden *Ibsalom and Ichabab* Part II 1662 the hostile *History* by Dr Gilbert Burnet 1721-31 the study *Shaftesbury* by H Hall 1856 and the S Papers in the Public Record Office.

Shaftesbury, Anthony Ashley Cooper, third Earl of (1671-1713) grandson of the first earl of S b at Exeter House London. In 1693 he entered Parliament as one of the members for Poole but his health suffering he resigned his seat in 1698, and went over to Holland, where he made the acquaintance of Bayle, Le Clerc, and other notable persons. His father dying the following year he returned home and distinguished himself in the House of Lords, but after the accession of Anne he never took any part in public life. In 1708 he pub *A Letter on Enthusiasm* in 1709 his *Moralists a Philosophical Rhapsody*, the same year his *Sensus communis an Essay on the Freedom of Wit and Humour* in which he announced his famous doctrine of ridicule being the test of truth, in 1710 his *Soliloquy or Advice to an Author* In 1711 a collected ed of all these works *Characteristicks of Men Manners, Opinions Times* (ed by J M Robertson, 1900).

His *Characteristicks* reveal religious scepticism and he was attacked as a deist by Berkeley and others. Other works suggest his sympathy with the Cambridge Platonists (q.v.) and with the teaching of Cumberland. His style stamps him as the man of classical learning imbued with the traditions of his class. Some critics have dubbed him a declaimer but his genuinely lofty sentiment gives value to his ethical speculation the best account of which is in his *Inquiry concerning Virtue in two Discourses* (1699) a work which shows the influence of Plato. His attack on egoistic hedonism accords with Butler's principles but it has been suggested that his criterion of morality is so nebulous as to be no more than a matter of taste. His aesthetic speculations are to be found in *Notion of the Historical Draught or Tablature of the Judgment of Hercules* S's influence on the Continent was great. Diderot trans his *Inquiry concerning Virtue* and in 1746 developed S's scepticism in his *Pensées philosophiques*. S's famous *Characteristicks* strongly attracted

Lessing, Wieland, and Leibnitz: Lessing's *Laokoön* (1876) reveals the influence of S.'s æsthetic thought. See lives by his son, 1734, T. Fowler, 1881, and J. M. Robertson, 1907; monographs on his philosophy by G. Spicker, 1872, and G. von Gizycki, 1876; and B. Rand, *The Life, Letters, and Philosophical Regimen of Shaftesbury*, 1900.

Shaftesbury, Anthony Ashley Cooper, seventh Earl of (1801-85), educated at Harrow and Christ Church, Oxford. He was introduced to parl. life as member for Woodstock in 1826. In 1831 he was made a lord of the Admiralty. Reform in poor law, the treatment of lunatics, and the condition of factory operatives were subjects with which he was connected. Largely through his efforts a Ten Hours Bill was passed in 1847. He was the champion in Parliament of the movement for 'ragged schools' and for nearly forty years was chairman of the Ragged School Union. His was the influence behind Lord Palmerston's Bill for the care and reformation of juvenile offenders. The Lodging House Act, which he piloted through the Upper House, was designed to improve the dwellings of the people; it was described by Dickens as the best piece of legislation that ever issued from Parliament. His *Speeches relating to the Labouring Classes* was pub. in 1868. See J. L. and Beatrice Hammond, *Lord Shaftesbury*, 1923; J. W. Bready, *Lord Shaftesbury and Social and Industrial Progress*, 1926; and Barbara Blackburn, *Noble Lord: the Seventh Earl of Shaftesbury*, 1919.

Shaftesbury, or Shaston, mun. bor. and mkt. tn. of Dorsetshire, England, 19 m. S.W. of Salisbury and 101 m. from London, on the main road from London to Exeter and Plymouth. The hist. of the tn. goes back more than 1000 years to the time when the Celts inhabited the dist. Their name for it was Caer Palladwr, but it was in Saxon times that it became notable, having been rebuilt about A.D. 880 by Alfred the Great, who founded a Benedictine abbey there, which was consecrated in 888, the first abbess being his daughter Ethelgeofa. It is mentioned in Domesday Book as a bor., being then more important than either Exeter or Dorchester. The abbey came into great repute owing to the re-interment there of the remains of Edward the Martyr in 981. So famous did the shrine of St. Edward become that the tn. was known for a time as the bor. of St. Edward, or Edwardstowe. S. received its charter in 1252. A new charter of incorporation was granted by James I. in 1604 and a third in 1664 by Charles II. and it is by virtue of this charter, as modified by the Municipal Corporation Acts that the tn. remains a bor. S. was a parl. bor. returning two members from the reign of Edward I. (1296) until 1832, and one member from that date until 1885, when the bor. was merged in the co. constituency.

S. has always been rich in churches. The abbey church at the zenith of its fame must have been a magnificent building, of the average size of an Eng. cathedral. It was demolished soon after

the dissolution of the abbey in 1539, but the foundations have since been excavated. St. Peter's Church, a very anct. building of the fifteenth century with traces of still earlier work, has finely decorated and battlemented parapet along the N. aisle and some beautiful vaulting. The Gold Hill Wall is of great interest, being a portion of the old tn. wall, built in Saxon times and buttressed in later years. The wall once had two gates leading into the anct. tn., which lay to the W. The grammar school was founded in 1818 and reorganised in 1872. The Westminster Memorial Hospital, built on land given by the late Elizabeth Mary, duchess of Westminster, was opened in 1871. Pop. 3000 (including suburbs) 4900.

Shag, see CORMORANT.

Shaghal, see JACKAL.

Shagreen, name given to the skins of various sharks, etc., which, being covered with closely set, calcified papillae, are used for polishing purposes when prepared. A kind of rough grained leather made in the E. was also called S.; it was manufactured from the skins of horses and asses, into which, when moist, seeds were pressed. Imitation S. is largely used in bookbinding.

Shah, word meaning ruler or prince, now applied particularly to the ruler of Persia. In his own land he is also called padishah and shah in shah (king of kings).

Shahabad: 1. Tn. in the United Provs., India, 15 m. from Lucknow. Pop. 25,000. 2. Tn. in Ambala dist., R. Punjab, Pakistan, 17 m. S.E. of Ambala. Pop. 15,000. 3. Dist. of Bihar and Orissa, Patna div., cap. Arrah. Area 1408 sq. m. Pop. 2,328,000. 4. Tn. of Hyderabad, India, 300 m. S.E. of Bombay. There are lime-stone quarries.

Shah Abdul Azim, see RUÉ.

Shahjahanpur, cap. of the dist. of the same name, United Provs., India, 43 m. S.E. of Bareilly, engaged in sugar refining. Pop. (dist.) 983,400; (tn.) 110,200.

Shah-Jehan, or King of the World (fl. 1627-58), fifth of the Mogul emperors of India, who subjugated Ahmednuggur in 1631. Aurungzebe, the son of S., gained great advantage over Bejaipur and Golconda. But a dangerous illness, which seized S.-J. in 1657, led to a civil war between his four sons for the succession. Aurungzebe, who gained the victory, confined his father in the citadel of Agra, where he died in Dec. 1666.

Shahnama, see FERID USI.

Shahpur, dist. and tn. of W. Punjab, Pakistan, the latter being situated near the R. Jehlam, 100 m. S.S.W. of Rawal Pindi. Area 4770 sq. m. Pop. (dist.) 998,900; (tn.) 10,400.

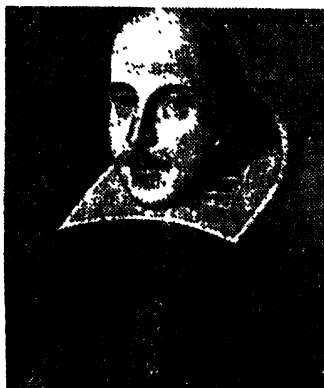
Shahpura, tn. of Rajasthan, India, 60 m. S.S.E. of Ajmer, and cap. of a state of that name. Area of state 103 sq. m. Pop. 61,200; (tn.) 9600.

Shake, see under ORNAMENTS, MUSICAL.

Shakers, popular name of the United Society of Believers in Christ's Second Appearing, founded about 1747 in England by James and Jane Wardley. They were early joined by Ann Lee, of Manchester, who, on account of a vision

vouchsafed to her in prison, claimed to be Jesus Christ in His second appearance. In 1754 the sect moved to America, and three years after the death of Ann Lee (1784) the society was carefully established on a communistic basis. It was thus the first communistic settlement in the U.S.A. See C. Nordhoff, *Communistic Societies of the United States*, 1875, and Anna Whitto and Leila S. Taylor, *Shakerism, its Meaning and Message*, 1905.

Shakespeare, William (1564-1616), Eng. dramatist and poet, was baptised at Holy Trinity Church, Stratford-on-Avon, April 26, 1564. The date of birth is not known, but is assumed to be April 23. He was the eldest son and third child of John S., son of Richard S., farmer of Snitterfield. John S. was a leather-dresser and whittawer (one who cured and whitened skins



N.P.G.
WILLIAM SHAKESPEARE
The Droeshout portrait.

in making gloves). A pair of Glover's dividers was used sometimes as his sign on documents. He lived in Henley Street, in a house now much restored, known as the Birthplace. Stratford in the sixteenth century was one of the principal market centres of Warwickshire, a prosperous town, with paved streets and good houses. The name S., spelt in many different ways, was common in the co. John S. was prominent in the borough's affairs, acting as juror, constable, assessor (assessor of fines at the court leet), chamberlain, alderman, and, in 1568, bailiff. After 1577 there is supposed to have been a decline in his fortunes, but in October 1596 there was a draft grant of arms, confirmed in 1599. He died in 1601. S.'s mother was Mary Arden, eighth daughter of Robert Arden, a small property-owner of Wilmore. Mystery surrounds the life of S. Nothing is known of his youth, but it may be taken as certain that he went to the free grammar school of Stratford. On Nov. 28, 1582, two sureties executed a bond for the issue of a licence by the bishop of Worcester for

the marriage of Wm. S. and Anne Hathaway of Stratford. When and where the marriage took place is not known. Anne was a daughter of Richard Hathaway of Shottery, and was eight years older than S. A child Susanna was baptised on May 26, 1583, followed by twins Hamnet and Judith on Feb. 2, 1585. Nothing further is known of S. until he is referred to in a pamphlet entitled *Greene's Grood-worth of W. H.*, pub. in London in 1592. It was supposed to have been written by the dramatic poet Robert Greene who died on Sept. 3, 1592, but was probably a forgery. The pamphlet is an attack upon the actors' companies: 'Yes trust them not: for there is an up-start Crow, beauteified with our feathers, that with his *Tyggers hart wrapt in a Players hide*, supposes he is well able to bumbast out a blanke verse as the best of you: and being an absolute *Johannes fac totum*, is in his owne conceit the onely Shake-scene in a countrey.' The printer, Henry Chettle, who was also a hack writer, issued an apology by the end of the year, in which he denied its authorship. The reference is important as it indicates that S., who was then twenty-eight, was established as an actor and playwright and able to do anything in the theatre, and the apology indicates that he had powerful friends. The pamphlet contains a parody of a line in *3 Henry VI*. A play, *Henry the VI.*, is recorded as performed at the Rose Theatre on March 3, 1592. The first plays bearing S.'s name were the narrative poems *Venus and Adonis* (1593) and *Lucrece* (1594), both dedicated to the young earl of Southampton. In Dec. 1594 we know that S. was a member of the lord chamberlain's company, with Richard Burbage, Wm. Kempe, and others. S. remained a member of the company, afterwards known as the King's Company, and wrote all his plays for it. The company had been formed by James Burbage who built the original Theatre at Shoreditch in 1576. S. was one of the builders of the Globe Theatre in 1599 and afterwards had a share in the Blackfriars Theatre in 1609, both of which were used exclusively by the company. In 1597 S. purchased New Place, Stratford-on-Avon for £60, and afterwards purchased other local property. His son Hamnet died in 1596, his mother in 1608. S. is reputed to have been well off, as he was a sharer in the actors' company and a householder. About 1610 he is supposed to have returned to live at Stratford. After 1613 he wrote no more. On March 25, 1616, he made his will. He died at Stratford on April 23, 1616, and was buried in Holy Trinity Church on April 27. His widow survived until 1623. There are records of legal transactions, otherwise everything else written about S.'s life is imaginary.

Plays.—S.'s plays are an achievement without parallel in literature; they cover the entire range of human life, treating it on the highest imaginative level. These plays show the drama to be not a mere conventional form of writing, but a special way of experiencing thought: what is

done in drama cannot be done in any other way. There is dispute about the plays, especially about their chronology, as there is about everything else connected with S. Sir E. K. Chambers's dates are followed in the main in the following: 1 *Henry VI.* is recorded on March 3, 1592; parts 2 and 3 may have been performed earlier, in 1591. The bloody but popular *Titus Andronicus* (1592), the melodrama *Richard III.* (1592); the two farces, *The Taming of the Shrew* (1593) and *The Comedy of Errors* (1593); and the two comedies of fashionable young men, *The Two Gentlemen of Verona* (1543) and *Love's Labour's Lost* (1593), complete the first period. Then came the tragedy of young love, *Romeo and Juliet* (1594); the marriage entertainment, *A Midsummer Night's Dream* (1595); the tragedies, *Richard II.* (1595) and *King John* (1596); the comedy, *The Merchant of Venice* (1596); the hist. plays introducing Prince Hal and Falstaff, 1 *Henry IV.* (1597) and 2 *Henry IV.* (1598); the comedy of manners, *Much Ado About Nothing* (1598); the patriotic play, *Henry V.* (1599), with which the Globe Theatre opened; and the romantic comedy, *As You Like It* (1599), which followed. The last long period of maturity opened with the tragedy *Julius Caesar* (1599), and includes the contemptuous *The Merry Wives of Windsor* (1600); the (ik. tragedy, *Troilus and Cressida* (1600); the most famous play of W. civilisation, *Hamlet* (1601); the comedies, *Twelfth Night* (1602), *All's Well that Ends Well* (1604), after Elizabeth's death and James I.'s accession, and *Measure for Measure* (1604); then the seven great tragedies: *Othello* (1604), *Macbeth* (1606), *King Lear* (1606), *Antony and Cleopatra* (1607), *Coriolanus* (1607), *Timon of Athens* (1607), and *Cymbeline* (1610), to which must be added *Pericles* (1608), and the three remarkable final works, *The Winter's Tale* (1611), *The Tempest* (1611), and *King Henry VIII.* (1613). There is plenty of room for discussion about these dates.

Apocryphal Plays. There are other plays ascribed to S. in whole or in part: *Edward III.*, *Arden of Feversham*, *Fur En.*, *Sir John Oldcastle*, *Lochrine*, *Sir Thomas More*, and *The Two Noble Kinsmen*, but none has been generally accepted.

Production.—The plays were written for production on the stage. They are therefore best appreciated in performance. The Elizabethan stage for which they were written was, however, in many respects different from the stages of to-day. It was a large open platform, surrounded on three sides by the audience, standing in the pit or seated in the galleries, with a canopy over it called the 'heavens,' from which properties or actors could be lowered, with a small curtained stage at the back, with a curtained balcony over it, and with a door at each side for the entrance of the actors. There was no scenery in any sense, though the plays were magnificently dressed and presented with heraldry and pageantry, and there were elaborate properties. The speech and movements of the actors were con-

ditioned by the fact that they were in close contact with the audience and had to play in three directions. This method of staging and performance continued until the theatres were closed and more or less destroyed in 1642, and, at the Restoration in 1660, it, and fr. ideas of staging prevailed, with scenes in perspective, which held the stage thereafter and developed into the picture-frame stage of to-day. The last of Shakespearian production since the Restoration may be described as a series of attempts to adapt the plays to a stage for which they were not intended. Thus the remarks of the great critics Dr. Samuel Johnson, Wm. Hazlitt, and Charles Lamb that S. was more for the study than the stage mean that they had no opportunity of seeing the plays performed. Since the work of Wm. Poel in London from 1889 onwards, attempts have been made to produce the plays as they were written, on stages approximating to the conditions of S.'s time. The most important of these attempts was made by Harley Granville-Barker between 1912 and 1914, when he produced *The Winter's Tale*, *Twelfth Night*, and *A Midsummer Night's Dream* at the Savoy Theatre, London. Since then the necessity of returning to the original methods of staging and performing the plays has generally been recognised, without, however, much practical results, as current methods of production still conform to the picture-frame stage.

Texts.—Eighteen of the plays were printed in S.'s lifetime, under conditions that are not known. Some of them were undoubtedly surreptitious texts. Those eds. are known as quartos, the plays thus printed being *Titus Andronicus* (1594); 2 *Henry IV.* (1594); 3 *Henry VI.* (1595); *Richard II.* (1597); *Richard III.* (1597); *Romeo and Juliet* (1597); 1 *Henry IV.* (1598); *Love's Labour's Lost* (1598); *Henry V.* (1600); 2 *Henry IV.* (1600); *Much Ado About Nothing* (1600); *A Midsummer Night's Dream* (1600); *The Merchant of Venice* (1600); *The Merry Wives of Windsor* (1602); *Hamlet* (1603); *King Lear* (1608); *Troilus and Cressida* (1609); and *Pericles* (1609).

After S.'s death *Othello* appeared in 1621. The first collected ed. of the plays is known as the First Folio, pub. in 1623 under the editorship of John Heminge and Henry Condell, two members of the king's company. The title page reads: 'Mr. William Shakespeare's Comedies, Histories and Tragedies. Published according to the True Originall Copies.' The vol. contained eighteen of the nineteen plays already pub., omitting *Pericles*, and eighteen plays now first pub., thirty-six plays in all. Whether S. had had anything to do with preparations for the pub. of the vol. is not known, but Ben Jonson had pub. a folio vol. of his 'Works' in 1616. Although the First Folio contains many misprints it is the foundation text of S. and after the A.V. of the Bible the most famous book in Eng. It was sold for 20s., and probably 1000 copies were printed, of which 230 are known still to exist. A reprint called the Second Folio

appeared in 1632, a Third Folio in 1663, and a Fourth Folio in 1685. Each was taken from the one that went before with corrections of errors and the addition of more errors. The Third Folio included *Pericles* for the first time, also six other plays that had been pub. during S.'s lifetime bearing his name or initials, though none was by him. The first eighteenth-century ed. based on the First Folio, but using the quartos for additions and emendations, was Nicholas Rowe's, which appeared in six octavo vols. in 1709. He divided the acts into scenes, where it had not been done in the First Folio, and indicated locations for some scenes. Alexander Pope (1725) used Rowe, amended the text considerably, and completed the divs. into scenes and their location. Other important eds. were those of Lewis Theobald (1734), Sir Thomas Hanmer (1743-44), Wm. Warburton (1747), Samuel Johnson (1765), Edward Capell (1768), George Steevens (1773), and Edmund Malone (1790). The most important nineteenth-century eds. were H. H. Furniss's *New Variorum*, which started pub. in 1871, and Clarke, Glover, and Wright's *Cambridge S.*, which in its revised 1891-93 ed. is the standard text of to-day. The important texts of the present century are the *New Cambridge S.*, ed. by Dr. J. Dover Wilson and Sir Arthur Quiller-Couch, the *New Temple S.*, ed. by M. R. Ridley, and the *Penguin S.*, ed. by G. B. Harrison.

Poems.—S.'s poems are in the literary tradition of the time, and have always been highly popular. The two long poems show consummate craftsmanship, and must have been written during emotional tension; such works were not mere exercises. *Venus and Adonis* (1593), a narrative poem of 199 stanzas, was reprinted nine times during S.'s lifetime. It was dedicated to the earl of Southampton. *The Rape of Lucrece* (1594) is another narrative poem of 265 stanzas, and was reprinted four times and again the year of S.'s death. It was also dedicated to Southampton. *The Passionate Pilgrim* (1599) contains twenty short poems, including two sonnets and verses from *Love's Labour's Lost*. It has no dedication, was almost certainly not printed with S.'s authority, some of the poems had been printed elsewhere, and some are certainly not S.'s. *The Phoenix and the Turtle* (1601) contains eighteen short stanzas signed William Shakespeare. The *Sonnets* (1609) are the most controversial of all S.'s works. They consist of a collection of 154 sonnets with a dedication, 'To the onlie begetter of these ensuing sonnets...' signed 'T. T.' There are various explanations of the dedication, none satisfactory, otherwise how the poems came to be printed is not known. No further ed. was pub. until 1840. Some of the sonnets are addressed to an adored young friend, a 'lovely boy,' others refer to betrayal of a friend, a rival poet, and an unfaithful black-eyed, 'black as hell as dark as night' woman. Many attempts have been made to rearrange the sonnets, to establish continuity, and to

interpret them, none satisfactory. They are mysterious but lovely.

Portraits.—The earliest is the bust contained in the wall monument in the choir of Holy Trinity Church, Stratford-on-Avon. The date of its erection is not known, but it was prior to 1623, as Leonard Digges in his verses 'To the Memorie of the deceased Author' in the First Folio refers to '... thy Stratford Monument, Here we alive shall view thee still.' It is assumed, without evidence, to have been executed to the order of Dr. John Hall, son-in-law of S. Anne S. was still alive. It was the work of a Flemish tomb-maker of Southwark, Garrett Janssen. Of local limestone, it was originally coloured, but was covered with white paint by the editor Malone in 1793, and its present state does not do it justice. The suggestion that the bust was restored is without foundation, and the illustration in Sir Wm. Dugdale's *Antiquities of Warwickshire* (1656), on which the suggestion rests, is undoubtedly inaccurate. The First Folio (1623) contained an engraving by Martin Droeshout, who was twenty-two, born in Blackfriars, son of a Flemish engraver. It is agreed that there are marked correspondences between this engraving and the Stratford bust, though both are lifeless. What is known as the 'Flower' portrait in the S. Memorial Theatre Gallery is alleged to be the original of the Droeshout engraving, but is probably an eighteenth-century work. A famous portrait is the Chandos, in the National Portrait Gallery, which came from the collection of the duke of Buckingham and Chandos. It is entirely unlike the engraving or bust, and indeed not very like any Englishman, but has been made the basis of many later portraits; it is attributed to Richard Buryage, and is said to have been in the possession of Sir Wm. Davenant. There are hundreds of other portraits, all fanciful. An interesting portrait, now in the possession of Clifford Bux, found in Bloomsbury in 1914, showing an elderly man holding a folio MS. vol. in one hand and in the other a quill pen, is thought by some to be possibly that of S. A new portrait is, however, brought to the National Portrait Gallery every year.

Anti-Shakespeare.—From late in the eighteenth century it has been disputed that S. wrote the plays attributed to him. Francis Bacon, Edward de Vere, seventeenth earl of Oxford, Roger Manners, fifth earl of Rutland, Wm. Stanley, sixth earl of Derby, Sir Edward Dyer, and others have their adherents as the true authors of the works. There is a considerable literature upon the subject, as the opponents of S. are ingenious, and each has plenty of evidence, but they rely mainly on the presupposition that a young man from Stratford-on-Avon, who became an actor, could not possibly have possessed the knowledge or intellect to enable him to write such marvellous works.

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Shakhty, formerly Alexandrovsk-Grushevsk, tn. in the Rostov Region of the R.S.F.S.R., 50 m. N.E. of Rostov. High quality anthracite is mined in the dist. Pop. 155,100.

Shale Oil. Oil shale is a stratified sedimentary rock in which are found numerous fragments of fossil plants and animals, principally aquatic form. Oil shale in its natural form does not contain any oil whatever, but it does contain on the average about 35 per cent organic

matter. The mineral base of oil shale presents a suggestion as to the origin of the organic matter. The mineral is a hydrous silicate of alumina, and as a general rule hydrous silicates of alumina have great absorptive power for hydrocarbons of large molecular weight. It is of hydrocarbons that petroleum is composed. S. O. can be obtained from the organic matter found in shale by means of pyrogenic distillation.

Oil shale is mined somewhat like coal, and is then crushed to convenient size and roasted in retorts in which its volatile components are driven off. The shale is fed by gravity from a storage hopper into the top of a vertical cylindrical retort, in which it is allowed to move slowly downward while it is being roasted until it is discharged from the lower end as waste. The gases and vapours formed are conveyed through condensing and scrubbing apparatus to separate the oil from ammonia, which is also given off. The oil is then refined by methods similar to those used in refining petroleum, but due to the greater percentage of objectionable compounds in S. O. the crude is subjected to more distillation and more chemical treatment. Motor fuels, fuel oils, burning oils, lubricating oils, and paraffin wax are obtained from S. O. S. O. was first produced in 1865 by Dr. James Young of Glasgow at Addiewell in the W. Calder dist. of Scotland. Over 90 per cent of the world's output of S. O. is produced in Scotland. See Cross, *Handbook of Petroleum, Asphalt, and Natural Gas*, 1924, and Lord Cadman, *The Romance of Oil*, 1930.

Shallot (*Allium ascalonicum*), plant allied to the onion and cultivated for its edible, delicately flavoured bulbs. It is grown in a light, sunny soil, and should be planted in Jan. or Feb.; the crop ripens in July. Two varieties are the true S., a full-grown bulb of which is the size of a walnut, grown chiefly for pickling, and the Jersey or false S., which has a larger and rounder bulb.

Shalm, see SHALM.

Shalmaneser, word in Assyrian is *Sulmanu-asarid*, meaning 'the god Sulmanu is chief.' Sulmanu or Shalman was the god of peace. There were five Assyrian kings named S. *Shalmaneser I.* (1320 B.C.) founded Calah (Nimrud), the second of the great Assyrian cities. *Shalmaneser II.* was the son of Asshur-izir-pal, and came to the throne in 858 B.C. He reigned for thirty-five years, the longest reign of any Assyrian king, and led numerous campaigns against the Hittites and the Syrians of Damascus, as well as warlike expeditions into Babylonia, Chaldaea, and Media. The most interesting campaigns were against Ben-hadad and Hazael (Hazael) of Damascus. His monument, an obelisk in black marble, is very fine and in excellent preservation. A sculptured relief exists, showing Israelite ambas. br. 'ing tribute to S. II. from Jehu, 'son of Omri,' as he is called in the inscription. *Shalmaneser III.* reigned from 781 to 771 B.C. He continued the warlike policy of his father, directing his

attacks specially against the Syrian states. *Shalmaneser IV.* also had a short reign, from 727 to 722 B.C. He became suspicious of the loyalty of Samaria and 'came up' against Hoshea, king of Israel, but the latter quickly submitted and paid the arrears of tribute (2 Kings xvii. 3). Some time later a third expedition was made against Syria, and siege was laid to Samaria, lasting for three years (2 Kings xvii. 5-7). Samaria fell 722 B.C. Probably before this date, however, S. IV's reign was ended by an internal revolution. A further biblical reference (2 Kings xvii. 4), there being a passage of time between verses 3 and 4) shows that the defection of Hoshea continued, and he was punished and thrown in prison sev. years later by S.'s successor Sargon. *Shalmaneser V.* laid siege to Tyre, but the siege was successfully withstood by Luli or Elukeus, king of Tyre and Sidon.

Shama, or *Copsychus saururus*, species of Turridae, found in India and sometimes seen as a cage-bird in Britain.

Shamanism, name which loosely embraces the chief religious beliefs and practices of the Finno-Tartaric races of N. Asia, and which has been extended to include the similar systems of N. America, in which the medicine-man takes the place of the shaman. These forms of religion are animistic, and their adherents believe in a multitude of deities inhabiting the sev. heavens, the earth, and the underworld. They unite in laying great stress upon the functions of the shaman, who by his incantations and magic rites compels the beneficent action of good spirits and wards off the attacks of the evil, healing sickness, bringing rain, foretelling the future, and so on.

Shamo, see GOBI, DESERT OF.

Shamrock, name of sev. trifoliate plants, one of which St. Patrick is said to have used to illustrate the doctrine of the Trinity, and has been made the national badge of Ireland. The army orders permit all Irish soldiers to wear S. on St. Patrick's Day in honour of the gallantry of their countrymen in the S. African war. The leaves of the yellow-flowered *Trifolium minus* and the white *T. repens* are generally used.

Shanalin Mountains, see CHANGPAI-SHAN.

Shandon, suburb of Cork city, famous for its bells, which ring every hour from the church tower.

Shanghai, city and treaty port of China in the prov. of Kiangsu, on the l. b. of the Hwang-poo, situated on the E. edge of the 'Great Plain' of China. The tn. is divided into two parts, the native quarter and the European or international settlement, with a pop. (1936) of 3,420,000 (including neighbouring dists.), including 1,450,700 persons in the foreign settlements. The native quarter, about 1 m. in diameter, with its narrow streets, and surrounded by walls, was once noted for its cotton industry. In S. an urbanised labouring class sprang up after the First World War. It consists mainly of people who have sold their lands and migrated to the city, and of younger sons and daughters who prefer

the freedom of city labour to the more restricted occupations of the army or domestic service, which are the usual lot of younger children and unmarried daughters. About 70 per cent of the modern industrial workers are women. The European settlement has grown since 1812, when it was chosen as one of the treaty ports of China, according to the treaty of Nanking. S. has a large foreign transit trade and a native junk trade; besides being a great trading port, it is a large manufacturing centre with cotton-spinning and weaving factories. There are also important tailoring factories, iron-works, weaving and dyeing factories for silk and wool, as well as cotton. There are match factories, printing works, manufs. of pianos, jute, and leather, carpentry works, leather factories, oil-pressing plants, paint works, brick and tile factories, and paper-mills. S. also has an important shipbuilding and ship-repairing trade, the concerns being mainly in Brit. hands. The harbour of S. has many wharves, all under private ownership, and vessels up to 24 ft. can pass through the harbour at any state of the tide. The harbour is large and can accommodate as many as 156 merchant vessels and twenty-two warships at once. There are eight dry docks of varying sizes, the largest being 584 ft. long. Considerable difficulty has been experienced in keeping the approach to S. clear, the Hwang-poo having two mud bars near the mouth. In 1912 an agreement was made between China and the treaty powers and the riv. was deepened, but traffic has increased so much that the main bar, outside the Hwang-poo at the mouth of the Yangtze, causes trouble. There is a naval dockyard in S., and its chief exports are rice, paper, cotton and silk, sugar, tobacco, and wool. The insurance interests of China are mainly centred in S. A new state bank, the Central Bank of China, was opened in 1928 with a capital of \$20,000,000. Later the name was changed to the Exchange Bank of China. S. has a mint. The gov. of China before the Second World War opened a ministry of communications college, and there are many Protestant and Catholic mission schools in S. A daily air-mail service before the Second World War was estab. between S. and Nanking. In 1927, owing to the grave threat to Brit. interests from the civil war then raging, the Brit. gov. sent out a force of 20,000 men to S. This force was increased in 1932 in consequence of the outbreak of war between China and Japan. In Jan. and Feb. 1932 there was heavy fighting between Chinese and Jap. troops N. of the international settlement.

In the Second World War S. fared much better than other great Far E. business centres such as Singapore and Hong Kong. It was in Jap. occupation in 1938, following the destruction in 1937 of the suburbs of Chapel and Nantao. Allied bombing attacks began seriously only in the last few months of the war. But targets were carefully selected. Oil tanks, wharves in the Yangtzepoo and Yukong areas,

and some war plants were either destroyed or severely damaged. None of the major public utilities, factories, wharves, warehouses, and railway stations was destroyed or badly hit; not a single prominent apartment or office building received a serious hit. But the city was badly exhausted by four years of Jap. 'co-prosperity' and 'development.' No useful or valuable constructive work of any kind was done by the Jap. Many industrial plants were completely or partly closed down for lack of raw materials or fuel, while in plants which continued in operation, machinery was strained to the utmost. Under the impact of currency depreciation, the living standard of the people of S., excepting for a small number of war profiteers and speculators, severely declined and the masses endured great deprivation. Brit. investments in S. valued at £100,000,000 pre-war gave opportunities for rich spoil to the Jap. Though most of these investments deteriorated and some were liquidated, the major portion emerged tolerably intact or apparently recoverable. The S. branches of Brit. banks were partially liquidated, so far as assets and liabilities in Chinese currency were concerned, by Jap. semi-state banks on behalf of the Jap. Navy. Securities in S. merchandise, which were backing loans and advances, were sold to quarters acting in collusion with the liquidators. Allied property was impounded in the process, but foreign exchange assets, almost exclusively in London and New York, proved untouchable. Local Brit. manufacturing plants were, in some cases, shut down and robbed of their merchandise stocks and most of their machinery; this applied especially to cotton mills and silk spinning. Other plants, etc., were commandeered and carried on, e.g. chemical plants and engineering works. Of Brit.-owned public utilities, gas and waterworks were well maintained. Brit.-owned real estate remained intact; bombing damage was small. Jap. 'enemy property' management in this sphere was extended to Brit.-registered Chinese property. The Jap. supervisors seized title-deeds and receipts for deeds. Many items of both land and buildings were sold clandestinely through bogus firms to obscure the origin of the property in the eyes of buyers in good faith (see *Economist*, Sept. 22, 1945).

Shanghai captured by Chinese Communists.—In 1949 S. was attacked by Communist forces (see CHINA, History), and was completely in their hands by the end of May. Gen. Lin Chiang-yi, the Nationalist vice-commander, surrendered with 40,000 of his troops after his final defence line along the Soochow Creek had collapsed. Peiping (where Mao-tse-tung (q.v.) had set up his cap.) radio on Aug. 17 announced that the S. military control commission planned to move 2,000,000 people out of S. by the spring of 1950 and to resettle them in 'useful occupations,' including agric. production. See also CHINA, History.

See W. H. Medhurst, *Shanghai and its Environs*, 1850; W. Pott, *Short History of*

Shanghai, 1928; T'ang Leang-Li (ed.), *Encyclopedia of Modern China* (Shanghai), 1933; and E. R. Hughes, *The Invasion of China by the Western World*, 1937.

Shanhakuan, fort, frontier tn. in Hopel, China, at the E. end of the Great Wall, 3 m. from the gulf of Likutung. Captured by the Jap. in 1895, it was defined as the southern limit of Russian sphere of influence by the Anglo-Russian Convention (1899). It has important machine shops. Pop. 30,000.

Shanklin, seaside resort on the S.E. coast of the Isle of Wight, 2½ m. N.E. by N. of Ventnor. Shanklin Chine is a wooded chasm in the cliffs (100–150 ft. high), with a small cascade at the upper end. Pop. (with Sandown), 12,500.

Shanks, Edward Richard Buxton (b. 1892), Brit. poet and journalist, b. in London and educated at Merchant Taylor's School and Trinity College, Cambridge. He was editor of the *Granada*, 1912–13, and lecturer in poetry at Liverpool Univ., 1926, and on the staff of the *Evening Standard*, 1928–35, being chief leader writer. His *Queen of China and Other Poems* (1919) was awarded the Hawthornden prize. Other pubs. include *The Island of Youth and Other Poems* (1921); *First Essays on Literature* (1923); *Bernard Shaw* (1924); *Queer Street* (1932); *My England* (1938); *Rudyard Kipling* (1939); *Elizabeth goes Home* (1942); *The Universal War and the Universal State* (1946); *Images from the Progress of the Seasons* (1947); and *The Dogs of War* (1948).

Shannon, Charles Hazlewood (1863–1937), Eng. painter, b. at Sleaford, Lincolnshire, son of the rector, Rev. F. W. Shannon. Educated at St. John's College, Leatherhead, he studied at Lambeth School of Art, and did much wood-engraving and lithography. A.R.A., 1911; R.A., 1921. His work has been defined as 'a protest against the vulgarity, the haste, and the ugliness of modern life.' Pre-Raphaelite influence is strong, but he was especially influenced by Charles Ricketts (q.v.) whose portrait was painted by S. His works include 'Tibulus in the House of Delia' (1898–99); 'The Wood Nymph' (1906); 'The Embroidered Shawl' (1914), many portraits, and eighty-three lithographs, beginning 1889.

Shannon, longest riv. of Ireland, rises in the Gullagh Mts. co. Cavan, 345 ft. above the sea. It flows through Loughs Allen, Boderg, Forbes, Ree, and Derg, past Limerick into the Atlantic. It has an estuary 70 m. long and 2 to 10 m. wide, is 210 m. long, and navigable by large vessels to Limerick. One of the main routes of airt. Ireland, the S. now produces electric power from a station at Ardnacrusha, N. of Limerick. Salmon have long been prolific. At S. port the estuary terminates a transatlantic airline. See L. T. C. Rolt, *Green and Silver*, 1950.

'Shannon', name of the Eng. ship which took part in the famous 'ocean duel' with the Amer. *Chesapeake* off Boston Harbour in 1813. After a terrific engagement lasting only fifteen minutes, the *Chesapeake* was disabled and captured.

Shans (highlanders, from Chinese *Shan*, mt.), number of tribes of Thai stock, who live in the borderland between China, Siam, and Burma. They call themselves Tai, or Punong, while the Chinese call them Pai-yl. They are closely allied to the Laos, both being akin to the Siamese. In appearance they are not unlike the Chinese, but have less slanting eyes and a paler, more European, complexion. A number of tribes are under the direct control of Chinese officials, but about 2,000,000 acknowledge the supremacy of Siam, and those living in the Shan states, though organized under their own chiefs, were under Brit. protection until Burma became an independent state, when they became, with the Wa states, a unit of the Burma union, known as the Shan State. The S. are skilled in gold and silver work, and carry on an extensive trade in silks, opium, straw hats, and tea. They worship Buddha, but retain many anct. superstitious practices. See A. R. Colquhoun, *Amongst the Shans*, 1885; E. Armonier, 'Les Tchâines' in *Revue de l'histoire des religions*, 1891; C. Cochrane, *The Shans*, 1916; and J. G. Scott, *Burma and Beyond*, 1932, and *Scott of the Shan Hills*, 1936.

Shansi (W. mts.), inland prov. of China bounded on the W. by the Hwang-ho and Shensi, on the N. by Mongolia and Jehol, on the E. by Hopei and Shantung and on the south by Honan. The N. region is very mountainous and the prov. is watered by the Sankan-ho, Fuen Ho, a trib. of the Hwang-ho, and other rivs. Although poor agriculturally, the prov. is rich in minerals, especially in coal, both bituminous and anthracite, and iron, the iron industry being the oldest in the world; copper, tin, salt, petroleum, and silver are also found but not much worked. In the south and south-west fruits and tobacco were grown extensively before the Jap. occupation, but the crops are not sufficient in the prov. for its own consumption even in normal times, and wheat, grain, opium, etc., are imported. The area is 60,375 sq. m. Cap. Taiyuan. Other tns. are Yangchih, Fenchow, Soping, and Pingyang. After the Jap. invasion of Manchuria Marshal Yen intensified schemes to exploit the coal and iron of the prov. Among the factories are iron- and steel-works, locomotive repair shops, cotton- and woollen-mills with over 50,000 spindles, flour-mills, tanneries, cement factories, paper, graphite, glass, ceramics, matches, fertilisers, and chemicals. All these industrial installations suffered grievously from the Jap. occupation. For many years S. was known as the 'model prov.'; to-day (1950) it is one of the poorest, having been hard hit first by the Jap. occupation, which continued throughout the Second World War, and then, after the war, by the civil war between the Nationalists and the Communists which broke out in Oct. 1945. Changchih was captured by the Communists, whose main power was concentrated in S. and Shensi, not only against the Chungking Gov. forces but also against the Jap. As a result the prov. was cut off by the Communists, and

by March 1948 the whole of the prov. was in Communist hands.

There is an old Brit. connection with S. dating back to the eighties of last century, when a Baptist medical mission was estab. in Taiyuanfu, Shansi Prov. Univ., the third univ. to be estab. in China, was built in 1902 with funds from the Brit. Boxer Indemnity Fund, and in its earlier years owed much to the guidance of Brit. educators. It was only with difficulty that the univ. started again after the Second World War. A large Rom. Catholic mission dates from the seventeenth century, and in the cap. the Catholic institutions include sev. schools, a hospital, and an orphanage. Pop. 15,025,000.

Shan States, former semi-independent states under the Brit. sphere of influence, in S.E. Asia to the N. of Burma. They were annexed to the prov. of Burma after the third Burmese war, in 1885, but the administration was left in the hands of local chiefs (*sawbaws*), under the superintendence of the commissioner of the Federated S. S. After 1922 there was a council of chiefs. Under the 1947 constitution of the Burma Union the former Federated S. S. and the Wa States were combined under the name of 'the Shan State.' The six N. states border on China and are mountainous; the thirty-seven southern states border on China and Siam and are crossed by the R. Salween. The remnants of the Jap. armies in Burma, after the Brit. forces had captured Rangoon on May 3, 1945, planned to escape through the S. S., but were compelled to lay down their arms when Japan surrendered in Aug. Area of northern states, 14,294 sq. m.; pop. 669,000; southern states, 40,324 sq. m.; pop. 927,000.

Shantar Islands, in the gulf of Ud-koi, off the Khabarovsk ter. of the R.S.F.S.R., comprise Great Shantar, Little Shantar, Feklistoo, and seven islets.

Shantung, maritime prov. of N. China, situated between the gulf of Liaoting and the lower course of the Hwang-ho. Its area is 55,801 sq. m., and it consists of a mountainous promontory, 100 m. wide, jutting into the sea for 200 m. The highest peak is a sacred mt. called Tai (111 ft. high). On the loess plains in the N.W. of the prov. grain and cotton, ground nuts and beans are grown, and silk and rice are produced in the sheltered regions. Various minerals, including gold and coal, are found in the mts. The fishing industry is prosperous, and vermicelli and straw braid are made. There are also many tanning factories. Confucius and Mencius were natives of S. Most of the people of S. are Buddhist, and practise also Taoism and Confucianism. The cap. is Tsinan. By the treaty of 1908 Great Britain held Weihaiwei in the N.E. until Oct. 1, 1930, when it was returned to China by a convention signed in April 1930, and Germany held the bay of Chiao-chou on the E. coast, which it seized in 1898, until it was captured by Japan in 1914, and returned to China in 1922, in accordance with the Washington Pact. Tsinan was captured by Jap. forces on

Jan. 8, 1938, and Tsingtao on Jan. 22. S. and other N. provs. were occupied by the Jap. in that year, but were liberated on the defeat of Japan in 1945. S. was one of the provs. principally affected in the early stages of the civil war between the Chinese Communists and the forces of the Chungking Gov. which broke out in the autumn of 1945, and it was completely in Communist hands by March 1948. Pop. 38,672,000. See also CHINA, History. See W. L. Godshall, *Tsingtau under Three Flags*, 1929.

Shapinshay, one of the Orkney Is., Scotland, 4 m. N.E. of Kirkwall. Length 5 m.; width $1\frac{1}{2}$ m. It contains many Pictish and Scandinavian antiquities. Pop. 620.

Sharawati, or **Sharavati**, riv. of India, rises at Ambur-tirtha, in Shunoga dist., Mysore, and flows through the W. Ghats down the falls of Gersoppa (altitude 960 ft.) into the sea at Honawar.

Sharebroker, see STOCK EXCHANGE.

Shareholder, see COMPANY AND COMPANY LAW.

Shares, see STOCK; STOCK EXCHANGE; TRANSFER AND TRANSMISSION OF SHARES.

Shari, riv. of Fr. Equatorial Africa, the chief feeder of Lake Chad. It forms the frontier of Bornu and Bagirmi, and is navigable from Fala to Gulfey (186 m.). Total length 1400 m.

Sharing of Profits (Profit Sharing), one of the various schemes of industrial remuneration devised with the object of securing to the 'workers' some pecuniary interest (over and above wages) in the increased efficiency of their labour, and generally of eliminating, as far as possible, the element of antagonism between capital and labour. The term is applied to those schemes in which 'an employer agrees with his employees that they shall receive, in partial remuneration of their labour, and in addition to their wages, a share, fixed beforehand, in the profits realised by the undertaking to which the profit-sharing scheme relates' (definition adopted by the Ministry of Labour). Co-partnership is an extension of profit-sharing whereby the worker accumulates his share of the profits in the capital of the business and thus becomes a shareholder. In no case of profit-sharing or co-partnership does the worker share in any losses the business may suffer. An essential feature of all such schemes is joint consultation between management and workers, designed to increase their interest in the work and to raise productivity.

The system has on theoretical ground received praise from some writers (see, for example, Sedley Taylor's *Profit Sharing*) and is propagated in the United Kingdom by the Industrial Co-partnership Association, founded as long ago as 1884. Its advocates assume that the incentive of profit stimulates conscientious work, and generally increases the efficiency of labour. The fallacy of this argument is, however, that profits depend exclusively or even mainly on labour, in other words, that it is possible to measure profits by labour. There is also, at least in theory, the danger that the workers may be tempted to

accept lower wages to offset the bonus distribution of profits, which would alienate its approval by the trade unions concerned. Nevertheless, a number of schemes have proved highly successful. There are many variations in practice according to the structure of the individual firms, but in general the agreed share of the workers in the profits varies from 4 to 10 per cent of their total wages-bill. In some cases the accruing share of profits is invested in the business itself on behalf of the workers, and in other cases it is paid into some provident or super-annuation fund.

Profit-sharing and co-partnership schemes proved especially successful in the gas industry. The first scheme in a gas undertaking was introduced as early as 1894, and by the time the industry was nationalised in 1918 there were fifty-eight companies operating profit-sharing or co-partnership schemes. In 1938 (the last complete pre-war year), nearly £117,000,000 was invested as capital on behalf of the workers in these undertakings, and an amount of £405,000 was paid in bonus to 52,779 employees entitled to participate; this averaged nearly £7 10s. per worker per year, or about 5 per cent of their wages. The future of these schemes has not yet been decided, but the minister of fuel and power has agreed that 'co-partners' should receive until March 31, 1951, in each year an amount equal to the average payments in the last three complete years before the vesting date (the date of nationalisation), or to the payment in the last of those years for which a payment was made, which ever was the greater. See D. F. Schloss, *Methods of Industrial Remuneration*, 1893; numerous pamphlets and the quarterly *Journal of Co-partnership* (Industrial Co-partnership Association, 36 Victoria Street, London, S.W.1).

Shark, general name for a large number of marine fishes with cartilaginous skeletons, forming with the Rays the order Elasmobranchii (q.v.). All modern S., as well as some of the extinct forms, belong to the order Selachii, which are divided into three sub-orders, Notidani, Squalli, and Relli. Notidani, which have only one dorsal fin, include a few archaic S., one of which is the frilled S. (*Chlamydoselachus anguineus*), a long, slender-bodied inhabitant of deep seas, with a depressed head and six pairs of gill openings with frills or flaps. Other Notidani S., some of which attain a length of 15 ft., occur in tropical and subtropical seas, and one has been caught off the Orkney Is. The rest of the living S. are comprised in the sub-order Squalli, which are characterised by the possession of two dorsal fins and five gill clefts. They differ from the rays in the gill clefts being laterally placed, and in the body being of the elongated type without flattening of the body or great enlargement of the pectoral fin, and there are over 150 species.

All pelagic as distinct from littoral S. are of large size, and some are surpassed in bulk and length only by the larger cetaceans. Those armed with powerful cutting teeth are the most formidable tyrants

of the ocean and dangerous to man whilst others which have but very small teeth feed on small fishes only or on marine invertebrates and are otherwise almost harmless and even timid which makes them seek the solitudes of the open sea. The best known *S.* belong to the families Lamnidae and Carcharidae. The former include the porbeagle *S. (Lamna cornubica)* which is sometimes caught off Brit. coasts and is not believed to be dangerous to man; it runs to a length of 10 ft. and ranges to New Zealand and Japan and the formidable great blue *S. (Carcharias glaucus)* which sometimes attains a length of 10 ft. The single species of the blue *S. (Carcharodon carcharias)* is found in nearly all tropical and subtropical seas though it has long been supposed to be approaching extinction. It is the most dangerous of all *S.* and the extinct species found in



GREAT WHITE SHARK

Tertiary strata must have been still more gigantic in size having teeth 1 in. wide at the base and 5 in. long. Also of the Lamnidae are the thresher or fox *S. (Alopias vulpes)* which is common on Brit. coasts and has an extremely long tail fin and the basking *S. (Selache maximus)* sometimes erroneously called the 'sun fish'. It is widely distributed in N. seas and is the largest fish of the N. Atlantic growing to more than 30 ft. in length. The teeth of the basking *S.* are very small and numerous arranged in several series and probably without use in feeding, and therefore this *S.* is quite harmless unless attacked. To the family Carcharidae belong many other tropical *S.* including the common blue *S.* so dangerous to bathers, and the hammerhead (*Sphyrna zygaena*). The whale *S. (Rhynchodon typicus)* the largest living *S.* attains a length of 50 to 60 ft. It occurs mainly in the Indian and Pacific Oceans and belongs to the small family of Rhynchodontidae and is harmless. The white *S. (Carcharias vulgaris)*, native of tropical seas is one of the largest and most formidable of the family. It is ash-brown above and white below. Among species found in Brit. seas, besides those already men-

tioned are the tope (*Galeorhinus canis*), not a destructive fish but may be trouble some to fishermen, the hound *S. (Murtelus canis)*, *Murtelus vulgaris* a small grey white spotted fish common not only on the coasts of Great Britain but on those of the U.S. on the Pacific. It is comparatively harmless fish and the porbeagle. The Greenland *S. (Lamna borealis)* belongs to the same family is the spiny dog fish (*Isurus paucus*) a littoral *S.* of N. seas but is much larger growing to 12 ft. in length. It is one of the greatest enemies of the whale. Its voracity in attacking it being so great that while feeding on the carcass of the whale it will allow itself to be stabbed with knife or spear without being driven away. In some cases *S.* are dried for food while their livers yield a large quantity of oil.

Sharon, plain on the east of the time, which stretches from Joppa to Casarea about 10 m. The roses for which it was famous in ancient times are supposed to have been native.

Sharor, city of Mecca Co. Pennsylvania U.S.A. on the Shenango R. Its manufactures include iron and steel castings, gas engines, oil tanks, automobile frames, steel rails and many other articles. It was incorporated as a borough in 1811 and as a city in 1918. Pop. 25,000. See also SHARON.

Sharp, Abraham (1611-1717) Eng. mathematician. At Little Horton near Bradford. He was apprenticed to a merchant at Manchester but moved to Liverpool and devoted himself to mathematical teaching and study. He gained some fame as an accurate designer and manufacturer of astronomical instruments.

Sharp, Cecil (1871-1921) Eng. composer. In London famous for his collection and arrangements of folk songs, country dances, morris dances, etc. He founded a school of music at Adelaide, Australia, in 1883 and the Eng. Folk Dance Society in 1911. Published 'Book of British Songs' (1902), 'Folk Songs Collected in the Appalachian Mountains' (1917) and 'English Folk Songs Some Conclusions' (1921). See W. Shuldham Shaw, Cecil Sharp and English Folk Dances, 1929 and life by A. H. Fox-Stanger, 1933.

Sharp, Granville (1733-1814) Eng. philanthropist and scholar. At Durham, and educated at the grammar school there. After being apprenticed to a linen draper, he obtained a post in the Ordnance Dept. But his chief title to fame was in connection with the abolition of slavery. It was entirely owing to his efforts that the decision was accepted that as soon as any slave sets foot upon Eng. territory he becomes a free man. He is described as the patriarch of the famous Clapham Sect (*q.v.*).

Sharp, William (1749-1824) Eng. engraver. In London. He executed many excellent plates from the old masters and others, including Reynolds's 'Holy Family' and West's 'King Lear in the Storm'.

Sharp, William ('Fiona Macleod') (1856-1905) Scottish writer. b. at Paisley, wrote under his pseudonym a remarkable

series of Celtic tales novels and poems including *Pharais a Romance of the Isles* (1894), *The Mountain Lovers* (1895), *The Sun Lader* (1895), *The Washer of the Ford* and *Green Fire* (1896), *The Laughter of Peterkin* (1897), *The Dominion of Dreams* (1899), *The Divine Adventure* (1900), *Irislam and Isull* (1902) and *Winged Destiny* (1904). He was one of the earliest and most gifted promoters of the Celtic revival in verse from the *Hills of Dream* (1896) *Through the Ivory Gate* (1901), and *The Immortal Hour* (drama) (1900). Under his own name he wrote *Earth's Voices* (1884) *Sospiri di Roma* (1891), *Sospiri d'Italia* (1906), poems and books on Rossetti Shelley Browning and Heine also a few novels. See Elizabeth A Sharp William Sharp a Memoir 1910

Sharpe, Charles Kirkpatrick (c 1781-1851) Scottish antiquary and artist the second son of Charles S of Hoddum Dunfermline. He graduated at Christ Church Oxford with a view to taking holy orders but on leaving Oxford he gave up all thoughts of entering the Church and in his thirtieth year took up residence in Edinburgh where he lived the life of a literary recluse. His writings include *Elfrida's Secret and the True History of the Church* (1817) *Tales from the Restoration to the Year 1678* (1817) *Tales & Memorials* (ed 1820) and *Ballad Book* (1823 re-ed in 1880 by David Laing)

Sharpness, seaport and vil of Gloucestershire England on the E bank of the River Severn 16 m S of Gloucester. A railway bridge across the riv 4162 ft in length affords easy facilities for trade.

Sharqia, administrative div of Lower Egypt Area 1905 sq m Pop 1 356 500

Shashang, or Sheshong name of five pharaohs or kings who ruled Egypt in the twenty second dynasty beginning in 950 BC. *Shashang I* invaded Palestine and sacked Jerusalem. He killed all the chief poets in the gov with members of the royal family so that Egypt soon became a land of petty kings. In the reign of *Shashang III* Piankhi the king of N Sudan invaded Egypt and conquered it. In March 1939 a tomb was opened in Fenis a city in the Nile delta and the mummy of one of the *Shashangs* was discovered in a silver sarcophagus.

Shashih, or Shasze, treaty port of China Hunan prov. on the E bank of the Yangtze River. It is connected with the Han ho by canal. The centre of a cotton dist with spinning and weaving industries. Opened to foreign trade in 1896. Pop 113 500

Shasta Dam, in Calif in the U S A, on the Sacramento R. It is the chief part of the Central Valley project and was completed in 1945. 255 000 ac of irrigated by some 25 per cent of the water content of which the rest is used for hydro electric plants producing 379 000 kilowatts.

Shasta, Mount, peak and extinct volcano of the Sierra Nevada in Shasta co. California one of the highest peaks in the U S A. Altitude 14 380 ft.

Shaston, see SHASTISBURY

Shat-el-Arab, see EUPHRATES

Shaving Soap, see under SOAP

Shaw, George Bernard (b 1856) Irish playwright and publicist b in Dublin. He worked for a time in an estate office but finding the work uncongenial came to London in 1876. For ten years his earnings as a writer were very small but with great courage he tenaciously pursued his chosen career. From his mother he acquired a love and knowledge of music which served him in good stead. He became successively a musical art and dramatic critic and in each revealed deep and provocative opinions. He



G B S

The portrait (c 1904) by Augustus John from the original in the Fitzwilliam Museum in Cambridge reproduced by permission of the Syndics and of the artist.

turned Socialist and in fact was the strongest individual influence in building up the Socialist party in England. In 1881 he joined the Fabian Society. Both in the Society and as an open air speaker his wit repartee, and clear argument were too much for his adversaries. From 1879 to 1883 he wrote *Veils of my Sonnet* among them being *The Irrational Knot* (1880) *Love among the Artists* (1881), *Cashel Byron's Progress* (1882) and *An Unsocial Socialist* (1883). He was critic of the three arts from 1886 to 1898, first on the *Star* (pseudonym, Cora di Bassotto) then on the *World* and finally on the *Saturday Review*. This period as critic was also responsible for *The Quiescence of Ibsenism* (1891, second and enlarged ed 1913), *The Sanity of Art* (1895), and *The Perfect Wagnerite* (1898). His vols *Our*

Theatre in the Nineties show his brilliant commentary on the stage of that period. By that time he had turned to drama, and from 1885 to 1913 wrote twenty-five plays, long and short, most of which have been pub., each play with a challenging preface by the author, in some cases equalling the play in length. His first four plays were *Widowers' Houses* (1893), an attack on the slum landlord; *Arms and the Man* (1894), in which he lampooned the facile romanticism with which popular opinion invests the profession of arms; *Mrs. Warren's Profession* (1902), in which he substitutes for the romantic courtesan a very capable prostitute turned procuress; and *The Philanderer* (1905), a denunciation of vivisection. Among his numerous topics were popular education, the worship of Shakespeare, the medical profession, politicians, clergymen, the Salvation Army, hunting and other blood sports, evolution, and love and marriage. He championed Ibsen and Wagner at a time when both were anything but popular. His temperament, however, had nothing of the grimness of Ibsen. If he threw light on the ills of society and its orthodox and 'accepted' standards he possessed an irrepressible Irish humour—at times no doubt tiresome and superficial—a command of rhetoric, and brilliant wit equal to that of Congreve, Sheridan, or Wilde, and these gifts lent his plays their unique quality. Yet if he was a propagandist in the sense that ethics, religion, socialism, and sex were his themes, he also had a rare gift for artistic form.

One obvious feature of his early plays was that he allowed his characters to utter all that agitated their minds, however disconcerting the revelation might be. Of these earlier plays, the first seven (pub. in 2 vols., 1898) are entitled *Plays, Pleasant and Unpleasant*, three being unpleasant and four pleasant. The unpleasant include *Widowers' Houses* and *Mrs. Warren's Profession*, the latter banned by the censorship. Another of S.'s plays to be censored was the short *Shewing-up of Blanco Posnet* (1909). These showed that S. was a serious playwright with progressive ideas, and hence, though at first a public, brought up on 'tailor-made' drama, did not necessarily sympathise with the use of the stage as a means of asking pertinent questions about social systems, the present-day universal acceptance of the view that social questions or any intractable problems can be honestly discussed in the theatre without necessarily impairing the entertainment value of the play is due in this country to S. more than to any other dramatist. Among the pleasant plays are the popular favourites *Candida* (1895) and *You Never Can Tell* (1899). In the latter he follows Ibsen in championing woman's freedom, besides creating a character who is attractive apart from the sentiments she has to convey.

Aristotle assigned to plot an importance in drama above characterisation; S. equally so, but not for the same reason, for with him the fable must be one which is suitable for a discussion of the lesson he

has in mind. Some critics assert that S.'s plays are devoid of plot, but actually his conception of plot differs in different plays. Sometimes it is the conventional story-plot, as in *Candida*, in *The Devil's Disciple* (1897), or in *Saint Joan* (1923); sometimes, as in *Getting Married* (1908), the story is of the slenderest texture; while in others, such as *John Bull's Other Island* (1904) and *Major Barbara* (1905), there is a compromise between the two methods. His first play, *Widowers' Houses*, is, in effect, an economic tract in dramatic form. In each of the three *Unpleasant Plays* the characters remain as puppets controlled by the *deus ex machina*. In the *Pleasant Plays*, on the other hand, the ideas for the first time become less significant than the persons who utter them, though the ideas lose none of their force. The three *Plays for Puritans* all inculcate the lesson of the folly of punishment and revenge. In *Cesar and Cleopatra*, which contains a noble portrait of Julius Caesar, in *Saint Joan*, and indeed in those written between these two, S.'s reversal of the ordinary conception of character, evident in his earlier plays, has remained the most consistent feature of his satirical comedy and it has been well said that this gives S.'s drama a 'vague classical quality, akin to the "humorous" characterisation of Ben Jonson.' In *Man and Superman* (1903), *John Bull's Other Island*, and *Major Barbara*, S. reaches, perhaps, the zenith of his power. The first-named deals in a novel and paradoxical way with the eternal question of sex relations. In *Man and Superman* is exploited S.'s dominating religion and the key to his work, the 'Life Force,' by which he means not a blind force like Schopenhauer's or Hardy's Immanent Will but a power making consciously toward a state of existence far more abundantly vital than anything yet experienced by mankind. The Life Force, however, will not work unaided, for men and women must act as willing agents for the furtherance of its great purpose. *John Bull's Other Island* deals with an important political question of the day, Home Rule for Ireland and its results, and even to-day has by no means lost all its force; whilst the third enunciates S.'s favourite thesis, that all the evils of modern life spring from the root of poverty. The plays from 1906 to 1911 are more didactic, containing less action and fewer dramatic 'situations,' and accordingly have enjoyed less popular appreciation. *Getting Married* (1905), however, has, more than any other play of his, merited frequent production, although it is pure dialectics without 'action' (in a crude sense as applied to the theatre).

S.'s historical plays (*Cesar and Cleopatra*, *The Devil's Disciple*, *Androcles and the Lion* (1913), and *Saint Joan*) are written with an actuality that purposely defies the historical sense. *Fanny's First Play* (1911) and *Androcles and the Lion* seem to indicate a return to the period of the 'pleasant' plays, for in these two S.'s ever-present didactic purpose is more subdued, or at any rate is overlaid by

agreeable fooling; and in the latter play the burden of discussion has been relegated to the prefatory essay on Christianity. S.'s later plays, *Heartbreak House* (1920), *The Apple Cart* (1929), *Too True to be Good* (1932), *The Millionairess* (1936), and *Geneva* (1938), reveal an emphasis on discussion, but with consummate skill in using a pattern of plot to keep the dialogue in suitable dramatic form. *Heartbreak House*, one of his greatest plays, is reminiscent of Tolstoy, and contains S.'s penetrating symbolisation of pre-1914 Europe. *The Apple Cart* is a play expounding the virtues of a monarchy in political stabilisation. In *Back to Methuselah* (1921), a cycle of five plays (*In the Beginning*, *The Gospel of the Brothers Barnabas*, *The Thing Happens*, *Tragedy of an Elderly Gentleman*, and *As Far as Thought can reach*), the Life Force, which as noted above appeared in *Man and Superman*, is pictured in the past and in full control of the future. In this connection it may be mentioned that S.'s intellectual antecedents were Samuel Butler and, in part, Nietzsche and Schopenhauer, but all his knowledge and control of facts are the outcome of wide reading. *Methuselah* and *Saint Joan* are considered by many critics to be his greatest dramatic works.

As implied earlier in this article, S.'s dominating idea was that of Socialist propaganda. This 'stern tyrannic thought' kept him for years at such work as that of a bor. councillor (St. Pancras, London) and at routine work on the committee of the Fabian Society (for this society he has ed., and contributed to, the famous *Fabian Essays*, and written many tracts and brochures). Besides dramatic art, S.'s ruling passion has always been the science of economics, and this more than anything has determined the cast of his mind. The culmination of many strenuous years as a pamphleteer is *The Intelligent Woman's Guide to Socialism*. S.'s attitude to the First World War was with sanity expressed in *Common Sense about the War* (1914) and to the Great Peace in *Peace Conference Hints* (1919).

S.'s other plays include *Overruled* (1912); *Pygmalion* (1912); *Great Catherine* (1913); *The Music Cure* (1914); *The Fascinating Foundling* (1914); *The Inca of Perusalem* (1916); *Augustus does his Bit* (1917); *Annajanski* (1918); *O'Flaherty*, F.C. (1920); *Jitta's Atonement* (trans.) (1923); *The Glimpse of Reality* (1927); *On the Rocks* (1933); *Village Wooing* (1934); *The Six of Calais* (1934); *The Simpleton of the Unexpected Isles* (1934); *In Good King Charles's Golden Days* (1939); and *Buoyant Billions* (1947). (See *The Complete Plays of Bernard Shaw*, 1931, which contains thirty-nine plays.) S.'s actual total is over fifty, and in addition there is a vol. of *Translations and Tomfooleries* and a revised last act of Shakespeare's *Cymbeline*, which was produced at the Embassy Theatre in 1937.

S. was awarded the Nobel prize for literature in 1925. He married, in 1898, Miss Payne Townshend. Since 1906 he has lived at Ayot St. Lawrence in Hertford-

shire. His house has become known as S.'s Corner. It is in the summer-house in his garden here that he has done most of his writing in recent years. After his death it will be maintained as a literary shrine, with some of its contents and books.

See authorised biography by A. Henderson, 1911; an unofficial biography by F. Harris, 1931; and S.'s own *Sixteen Self Sketches*, 1949. See also studies by H. Jackson, 1907; G. K. Chesterton, 1909; J. Robertson, 1925; J. S. Collis, 1925; L. Harris, 1931; M. Colbourne, 1939, 1949; H. Pearson, *Bernard Shaw: his Life and Personality*, 1942, and *G. B. S., a Postscript*, 1949; and C. E. M. Joad, 1949; also S. Winsten, *Days with Bernard Shaw*, 1948, and a selection of letters, *Ellen Terry and Bernard Shaw: a Correspondence*, 1949.

Shaw, Henry Wheeler ('Josh Billings') (1818-85), famous Amer. humorist, b. at Lanesborough, Massachusetts, U.S.A. Son of a Congressman and well educated, he roamed throughout the W., doing odd jobs on steamboats, farms, and shops for about twenty years, thereby acquiring a wide knowledge of his fellow men. In 1858 he settled in Poughkeepsie, New York, as a real-estate agent. His first attempts at writing were contributed to the modest local journals under his pen-name. They attracted attention by reason of their unorthodox spelling and dry humour, and he was soon a valued contributor to New York city papers. His first book, *Josh Billings: His Sayings*, was pub. in 1866. Others followed, and many of his witty remarks are still current quotations in the U.S.A. See life by F. S. Smith, 1883.

Shaw, Martin (b. 1876), Eng. composer and organist, b. in London, studied under Sir Charles Stanford. He is chiefly known for his vocal music, which, though modern in form, has a strong national and 'folk' strain, and he has done much to cultivate community singing. *Up to Now*, his musical reminiscences, was pub. in 1929. His brother Geoffrey, inspector of music to the National Board of Education, has also composed pieces inspired by a strong national instinct and, like Martin, has written much on music. Both have done much to revive the music of Purcell, and both have taken part in the movement for restoring the music of the Eng. Church to its pristine dignity.

Shaw, Richard Norman (1831-1912), Brit. architect, b. in Edinburgh, where he was educated. He studied architecture at the Royal Academy Schools, and was awarded the gold medal and travelling studentship of the Royal Academy. In 1858 he pub. *Architectural Sketches from the Continent*, a series of drawings of auct. buildings, mostly gothic. S. became an R.A. in 1887, and was joint editor of *Architecture*. He strongly influenced modern architecture with his artistic fondness for half timber, projecting gables, massive chimneys, and hanging tiles. But his best and most complete work is New Scotland Yard, a composition conspicuous for its breadth and unity.

Shaw, Sir William Napier (1851-1945), Brit. meteorologist and physicist, b. at Birmingham, son of a goldsmith, and educated at King Edward's School, Birmingham, and Emmanuel College, Cambridge, of which he was a fellow and senior tutor. Appointed by Lord Rayleigh joint demonstrator with Sir Richard Glazebrook at the Cavendish Laboratory, in 1885 he collaborated with the latter in the pub. of a *Text-book of Practical Physics*. After some years as a univ. lecturer in experimental physics he was appointed (1897) by the Royal Society a member of the Meteorological Council, of which he became secretary in 1900, and from 1905 to 1923 he was director of the Meteorological Office, where he rendered valuable service in the development of meteorology as a physical science. In the First World War he was adviser to the gov. on meteorology, afterwards becoming prof. of meteorology at the Royal College of Science, until 1924. S. was elected a fellow of the Royal Society in 1891 and knighted in 1915. He was president of the Permanent International Meteorological Committee from 1907 to 1923, and president of the meteorology section of the Union Géodésique et Géophysique Internationale from 1921 to 1930. S. was awarded the Symons Medal of the Meteorological Society (1910), a royal medal by the Royal Society (1923), and a Buys Ballot medal (Amsterdam, 1923). He pub. a *Manual of Meteorology* (1919-1931) and *Drum of Weather* (1933).

Shawl, article of dress, usually worn over the shoulders as a wrapping. It is an essential feature of the native dress in certain parts of India and Persia, etc., but even in the E. it is much less worn than formerly, and in Europe it has quite gone out of fashion for feminine attire. The best S. are woven in Kashmir from the 'pashm,' or under-wool of the S. goat of Tibet. In the Punjab, especially at Amritsar, S. are manufactured from inferior 'pashm' and also from 'koork,' a goat's wool imported from Kirman in Persia.

Shawm, or **Shalm**, primitive woodwind instrument, the forerunner of the oboe, with a double-reed mouthpiece and a wide bell. The largest types had bent tubes to their mouthpieces and thus approximated more to the bassoon. The S. of the Psalms is a misrendering of shofar (q.v.).

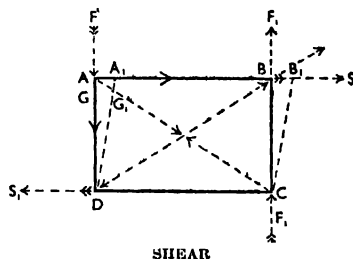
Shawnee, city in Pottawatomie co., Oklahoma, Massachusetts, U.S.A., having cotton-seed oil mills, cotton compresses, and cotton gins. Pop. 23,283.

Shawnees, N. Amer. Indian tribe, belonging to the Algonquin family. They are now limited to a reservation in Oklahoma, but from 1700 onward they were driven by wars to seek refuge now in New York State, now in S. Carolina, and yet again in Ohio.

Shawnegan Falls, vil. of Quebec, Canada, in St. Maurice co., 6 m. from Shawnegan. The falls are 150 ft. high, and are utilised for hydro-electric power. Aluminium, lumber, and carbide manufs. are carried on. Pop. 24,800.

Shear. When a body is subjected to a

load which tends to make one part slide on the next it is said to be 'in shear,' and the induced stress is called a *shear stress*. It is defined as being of so many tons or lb. per sq. in. of the section under consideration. The shear in a beam varies in intensity from zero, at the upper and lower surfaces, to a maximum at some intermediate sector. At any point in the beam there is a vertical and a horizontal shear stress of equal intensity. Uniformly distributed shear across a small element of surface is illustrated by the shear stress across a rivet holding together two plates loaded longitudinally, the rivet being then described as being in *single shear*, the stress being uniform. Where, for example, the rivet joins a forked piece to a single central plate, the rivet is said to be in *double shear*, being capable of sustaining a greater load than it will safely carry in single shear. The shear produced when one layer of a body tends to rotate on the rest is called a *torsion*.



SHEAR

In the accompanying figure, a block of material has shear stress represented by the line S-S'. There being no movement of the block, a force S_1 equal and opposite acts along the under surface resting on a table. The broken lines show the movement of the horizontal layers, and it is evident that for homogeneous material $AA_1/Ad = GG_1/GD$. The shear strain can thus be stated for unit distance: 1 in. above the fixed surface DC; or it may be stated in radians as the $\angle ADA$. The stress and strain are proportionate, and the ratio for any material is its *modulus of rigidity*; in the case of steel this is 13,000,000 lb. per sq. in., that is to say, the stress is 13,000,000 times the strain. In the figure, the couple SS_1 would produce bending and not simple shear strain; that would be obviated by an equal couple FF_1 . For a unit cube of the material, the shear strain = NS , where N is the modulus of rigidity and S the tangential force. It is clear that there will be a compression strain resulting along AC, and a tensile strain along BD. In the construction of bridges, roofs, etc., where girders are used, ties can be introduced here to counteract the forces and ensure rigidity of frame.

Shear Legs, or **Shears**, are machines used for lifting and moving for a short distance horizontally heavy weights. They are often constructed temporarily of stout poles for building works and quarries, but

are also constructed of tubular steel for dockyard work, when they lift as much as 200 tons. Two legs form an isosceles triangle capable of some rotation on its base; a third leg from the apex reaches the ground well behind the middle of the isosceles base, and its forward or backward movement raises and lowers the apex as well as moving it to and fro. Pulley tackle is used for increasing the lift; this is worked by a winch either manually or by steam. In dockyards they are often fixed on floating platforms.

Shearwater, name applied to any of the twenty species of *Puffinus*, a genus of Procellariidae. These birds are closely related to the petrels, albatrosses, and Cape pigeon, and in colour they are dingy brown above and white below. See, as *P. anglorum*, breed on Brit. coasts. See R. M. Lockley, *Shearwaters*, 1912.

Sheathing, see under SHIPBUILDING.

Sheave, see under PULLEY.

Sheba, anct. kingdom of Arabia, famous for its wealth in gold, gums, and spices, its people being known as the Sabaeans (*q.v.*), who dwelt in the Yemen, S. Arabia. The remains at Saba have been the subject of modern research. Abyssinian tradition dates its royal house from Solomon and the queen of S. The story of the queen of S.'s visit to Solomon's court is told in 1 Kings, and the original Monelek, king of Ethiopia, is said to have been her son by Solomon. See further under ARABIA.

Sheboygan, cap. of Sheboygan co., Wisconsin, U.S.A. It lies on Lake Michigan, 53 m. by rail N. of Milwaukee, and is noted for its leather goods and chairs, its cheese exports, and its state fish-hatchery. Pop. 40,600.

Shechem, city of anct. Palestine, which lay in the throat of the valley which cuts Mt. Ephraim in two, having Ebal and Gerizim on either side. It probably lay to the E. of the site of the present city, which has some 25,000 inhab. and is called Nablus (*q.v.*).

Shechinah, or **Shekinah**, expression frequently occurring in the Targums and Talmud to denote the divine presence, the idea being developed in Jewish Rabbinical thought after O.T. times. The original conception grew from the description of the presence of the Lord in the holy of holies in the tabernacle, indicated by the cloud enveloping the manifestation of God, which was thought of as the light behind the cloud.

Sheen, see RICHMOND.

Sheep, ruminant animal, which has been domesticated from a very remote period. Wild S. occur in various parts of the world, and the Moufflon is still in a semi-wild state in the is. of Sardinia and Corsica, but the origin of the various domesticated breeds is very uncertain, though it is probable that they are derived from various stocks which have been intermingled. Britain has long been one of the chief S. countries of the world, and its breeds are valued so highly that pedigree animals are in constant demand for export to all the other sheep-producing countries for the improvement of the local breeds. The two most notable

breeds of S. which owe nothing to Brit. blood are the Merino, bred almost exclusively for its great quantity of fine wool, and the Astrakhan or Caracul, the lambs of which yield the valuable fur. Mention should also be made of the milk-yielding S. of France, the most notable breed of which is the Larzac; its milk is used chiefly in the production of Roquefort cheese. The Brit. breeds of S. are considerably less numerous than they were a century ago, all but the best of them having been incorporated in more modern breeds suited to present-day requirements.

Existing breeds are usually classified as (1) mountain and moorland S. and (2) lowland S., the latter class being subdivided into (a) Longwools and (b) Shortwools, into which last category the Down breeds fall. The chief mt. and moorland breeds are Blackface, Welsh Mt., Rough Fell, Lunk, Derbyshire Gritstone, Swaledale, Exmoor Horn, Dartmoor, Cheviot, and Herdwick (which last has the distinction of possessing an extra rib). These are hardy, good foragers which thrive on poor food; slow maturing in their natural habitat, but when kept under good lowland conditions producing lambs which fatten readily. Most of the lowland longwooled breeds have been improved in the past by crossing with the Leicester, which was originally a large, heavy-fleeced, slow-maturing animal. About 1750, Robert Bakewell of Dishley began to breed for an early maturing, moderate-sized animal by rigid selection and inbreeding, and was rewarded with enormous success, the Dishley Leicester becoming world famous. Other Longwools are the Border Leicester, the Lincoln (the largest and heaviest breed of domesticated S.), Kent or Romney Marsh, Cotswold, Wensleydale, South Devon, Devon Longwool, and Roscommon (the only Irish pure breed). They are all characterised by absence of horns, a heavy fleece of long, lustrous wool, and whitish face and legs, and are associated with districts where food is plentiful. The mutton is not generally considered of the finest quality. In the shortwool category the Down (Southdown Hampshire, Dorset, Shropshire, Oxford, Suffolk) breeds all owe much to the Southdown which was used in their formation. The Southdown has long been famous for the perfect quality of its mutton, and it is unsurpassed for rapidity of feeding and early maturity, while the close fine wool realises very high prices. The Down breeds were originally associated with Down districts, of somewhat high elevation, with dry soils, but are now widely distributed. Other short-wool breeds of note are Dorset Horn, Ryeland, Kerry Hill, and Clum Forest, which last has found favour in recent years for ability to thrive on grass and arable, standing up well to winter folding. The Dorset Horn deserves mention as being our only breed to come into season all the year round and is thus capable of producing three crops of lambs in two years.

Every breed has its distinct characters, which, as a rule, are only preserved when

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Photographs 1 W. Sladdin, Kew, S. W. Australia 2 8. Farmer and St. I. Leeder

SOME NOTABLE BREEDS

- 1 Merino (ram) 2 Longwools 3 Kent or Romney Marsh (ram) 4 Scottish Blackface (shearling ram)
- 5 Welsh Mountain (shearling ram) 6 Border Leicester (shearling ewe) 7 Cheviot (ewe)
- 8 Shortwools 9 Suffolk (shearling ram) 10 Southdown (shearling ewe)

the S. are bred in the dist. of their origin. Elsewhere they soon become modified, and it seems likely, therefore, that Brit. breeds will long continue to be of importance as sources of fresh and improving blood for stock of the great sheep-pasturing countries. Sheep breeders have long appreciated the value of hybrid vigour from first-cross animals, and three notable crosses which are commonly kept in flocks are: (1) the Scotch half-bred (Border Leicester \times Cheviot), (2) the Masham (Wensleydale \times Blackface); (3) the Grey-face (Border Leicester \times Blackface). The trend of S. keeping in Britain during the last half century has been that, with rising labour costs, etc., the arable S. gave way largely to grassland flocks with a steady decrease in total numbers. This decrease greatly accentuated during the war years as more and more grassland was ploughed out. More widespread use and knowledge of chemical fertilisers, too, has probably done something to cause farmers less reliance on 'the golden hoof.' It is probable that with extension of ley farming and return of some wartime arable to grass, S. numbers will increase, but there is little doubt that the vast S.-producing areas of the dominions, notably New Zealand and Australia, will continue to produce economically and supply much of our requirements of lamb, mutton, and wool.

S. are subject to a number of diseases. S.-pox, one of the worst of them, has not occurred in Britain since 1862. Liver rot has often caused heavy loss, but understanding of the complex life-history of the liver-fluke (*G.*) has enabled it to be controlled. S.-scab, a skin disease caused by mites which set up great irritation with rapid exhaustion, is prevented by dipping in an arsenic, sulphur, or other dip. Other parasite troubles are those caused by flies, worms, and ticks. In N. dists. in Great Britain much loss is caused by 'scrapie,' a wasting disease due to a bacillus isolated for the first time in 1913, after an investigation was started. In the past many fleeces have been spoiled from the manufacturer's point of view by the use of noxious marking fluids (paint, tar, etc.) when marking S. for identification at various times in their life. Suitable marking fluids are now available giving a semi-permanent mark during life which can be removed easily during manning. See also ANTHRAX; FOOT-AND-MOUTH DISEASE; LOUPING-ILL. See J. Wrightson, *Sheep Breeds and Management*, 1893; Ministry of Agriculture, *British Breeds of Livestock*, 1920; W. L. Williams, *Veterinary Obstetrics* (4th ed.), 1913; National Sheep-breeders Association, *British Pure-bred Sheep*, 1946; and A. Fraser, *Sheep Production*, 1947.

Sheep-dip, preparation in which sheep must be annually dipped, by law, as a preventive of the mite which causes sheep scab.

Sheep-dog, Old English, see OLD ENGLISH SHEEP-DOG.

Sheep-dog, Shetland, see SHETLAND SHEEP-DOG.

Sheep-dog Society, International, see under SHEEP-DOG TRIALS.

Sheep-dog Trials, demonstrations of sheep-dog handling, are now a common feature of agric. shows. It is noteworthy that the replacement of the bob-tailed Old Eng. sheep-dog by the black-and-white Border Collie on the sheep-runs was complete fifty years ago.

Trial grounds are relatively standard in size, varying only where the nature and area of the land available does not permit of a full-sized course. Under the auspices of the International Sheep-dog Society, formed in 1905, an international championship is competed for annually, the trials being held in England, Scotland, and Wales in turn. For this event five sheep (two of which are marked) are released 440 yds. from the competitor, unsighted by the dog. On command the dog should do a wide, fast 'outrun,' slowing down behind the sheep to 'lift' (start) them gently, and fetch them quietly and firmly, without forcing, between two hurdles (fetch flakes), up to and round the handler. An away drive of 150 yds at 45° angle, the left, up to and between the 'away-drive flakes,' and a cross-drive of similar length and object complete the 'off-hand' work. Until this point is reached the handler must remain at a post-marked position at the apex of an inverted equilateral triangle, with the away drive and cross-drive flakes forming the other corners, but for the 'on-hand' work which follows he is free to move about. The dog then brings the sheep to a 20-yd. diameter sawdust-marked 'shedding' ring, and must separate (or 'shed') the two marked sheep from the other three, and keep them under control away from the others to the judges' satisfaction. The whole fleec must then be penned in a 6-ft. square pen and the hurdle gate closed on them, following which they are driven back into the 'shedding ring,' where the dog must separate one of the two marked sheep away from the rest and keep it under control. There is a 15-min. time limit for the completion of a full-sized course; and the judges award points as follows, outrun 10 points, lift 5, fetch 10, drive 10, shed 5, pen 5, single 5, style 5; maximum points 55.

Sheep Louse, or **Sheep Ked** (*Melophagus ovinus*), wingless insect of the family Hippoboscidae or Pupipara, which lives in the wool of sheep, feeding on the skin-waste and on the blood. It has a small, narrow thorax and a large oval abdomen, and is greyish-brown in colour. As in other members of the family, the egg is hatched and the larval stage completed within the female body.

Sheepshanks, John (1787-1863). Eng. art collector, was a cloth manufacturer of Leeds. In 1857 he bequeathed to the nation his splendid collection of paintings, including pictures by Landseer and Leslie.

Sheepshead, or *Sargus oris*, member of the sea-bream family, or Sparidae found off the coasts of the U.S.A.

Sheepshead Bay, small inlet of the Atlantic, near Coney Is., New York, near which is a famous racecourse.

Sheep Staggers, see LOUPING ILL.

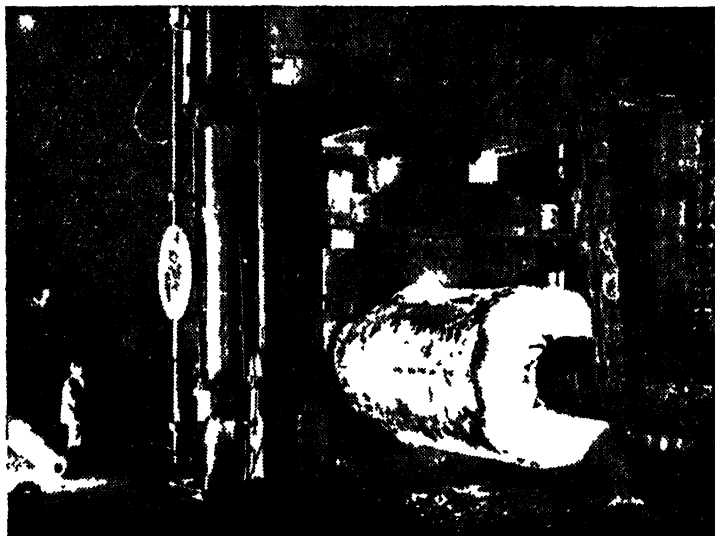
Sheerness, seaport and naval estab. in the Isle of Sheppey, Kent, England, at the mouth of the R. Medway. It has a harbour and a dockyard, which played important parts in the two world wars. The more modern part of the tn., Sheerness-on-Sea, is a seaside resort. Pop. 16,400.

Sheers, see **SHEAR LEGS**.

Sheffield, John, see **BUCKINGHAMSHIRE AND NORMANBY, DUKE OF**.

Sheffield, city, municipal co. and par. bor. in the W. Riding of Yorkshire, England. Its importance is due to its industry, particularly its steel and steel products.

workable seams, including the famous Silkstone seam within the city boundary to the E. S. is watered by the Don and its tribs., the Loxley, Rivelin, Porter, and Sheaf, flowing from the millstone grit. The junction of the Don and Sheaf formed the original nucleus of the tn. Except to the E. it is surrounded by moorlands, including the Peak to the W., and the southern Pennines. Earl Walthof had a hunting seat in the vicinity in pre-Conquest times. Under the Norman de Bush and his successors, the Lovetots and Furnivals, the castle and par. church,



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SHEFFIELD: THE STEEL INDUSTRY

In the Vickers works of the English Steel Corporation a 200-ton ingot is being forged in a 7000 ton electro-hydraulic press

steel for general purposes is produced, but S.'s unique position depends on its special steels, such as permanent magnet steel and heat- and acid-resisting steels, most of which were invented in S. laboratories and works. Its forges include rolling, plate, and wire mills, producing a large variety of high-grade mechanical components. Its cutlery industry embraces knives, razors, scissors, and surgical instruments, with connected trades in horn, pearl, bone, and celluloid; edge tools include agric. machine knives, joiners', carvers', mechanics', and garden tools, and coal cutting and boring tools. The production of silver and electro-plate goods, with silver and gold refining, form another group of industries connected with cutlery. Coal-mining, type-founding, snuff manuf., confectionary, and brewing are also carried on.

Situated on the coal measures, with

with the bridge over the Don, formed the chief features of the little tn. Thomas de Furnival granted it a charter in 1297. Under the Talbot earls of Shrewsbury until 1616, it was closely connected with one of the foremost noble families of the day. The Talbot earls often resided in the tn., and in the early sixteenth century built the Manor Lodge and the Shrewsbury chapel in the par. church. In 1616 the manor passed to the Howard family, the present duke of Norfolk retains considerable interests in the city as ground landlord.

S. has a long industrial hist. Iron was worked in the vicinity in the twelfth century, and it was famed for its knives by the time of Chaucer. In 1824 the Company of Cutlers of Hallamshire was incorporated. S. long remained the industry of the 'little mester,' and saw some of the worst features of early trade unionism,

culminating in the S. outrages of 1864. The later eighteenth century saw other industrial changes. The invention by Boulsover in 1742 of the method of coating copper with silver to form the well-known 'Sheffield plate,' estab. an industry which flourished until it was superseded by electro-plating in the 1810s. In 1740 Huntsman invented the process for making crucible steel, and later estab. his works at Attercliffe. At the same time coal began to be widely used for smelting. Even more important was Bessemer's converter of 1856. The demand for steel for railways, armaments, and constructional purposes at the same time really made modern S. In 1843 the tn. was incorporated as a bor., and made a city fifty years later. It was first represented in Parliament in 1832. Since 1918 it has returned seven members.

Few buildings of historical importance remain. The castle was destroyed after the Civil war, but the Manor Lodge still stands. The old par. church of St. Peter and St. Paul became the present cathedral: enlargement, begun in 1937, was partially completed in 1942. A few old grinding mills still stand beside the streams, and the remains of Beauchief Abbey are now within the city boundary. The tn. has fine public buildings, notably the tn. hall, opened in 1897, the Cutlers' Hall, erected in 1832 on the site of previous buildings, the city hall, opened in 1932, and the central library and Graves Art Gallery, opened in 1934. Here are kept the Fitz-William monuments from Wentworth Woodhouse purchased by the city in 1949. There are sev. public parks, including Weston Park, with the museum, observatory, and Mappin Art Gallery. Whiteley Woods, Blacka Moor, and other parts have been preserved as public open spaces. Municipal services include the water supply with its fine reservoirs in the Loxley, Rivelin, and Ewden valleys, tramways and omnibuses, and (until 1915) electricity. The univ. obtained its charter in 1905. It is specially noted for its technological and medical studies, and confers degrees in metallurgy. Since 1900 the city has been enlarged by the inclusion of dists. of Derbyshire and the W. Riding. The Cutlers' Feast is an ann. event, at the installation of the master cutter for the year. In 1911 the diocese of S. was created out of part of the diocese of York. Pop. (1945) 476,360. *See* W. T. Freemantle, *Bibliography of Sheffield*, 1911, and T. W. Hall, *Incunabula of Sheffield History*, 1937.

'Sheffield Daily Telegraph,' one of the oldest daily morning papers in the Brit. Isles outside London. Formerly of independent political opinions, it has for long been consistently Conservative. Until 1925 the proprietors were Sir W. C. Leng & Company, who also owned the *Sheffield Evening Telegraph* and *Star*, and the *Weekly Telegraph*. In that year the S. D. T. was bought by Allied (now Kemsley) Newspapers. The *Sheffield Independent* was amalgamated with it in 1938.

Sheffield Plate, *see under* SILVERSMITHS' WORK.

Shefford, small tn. of Bedfordshire, England, on the Ivel, 8 m. S.E. of Bedford, with remains of an anct. priory. Local industries include the manuf. of corsets and insulating tapes, and laundering. Pop. 2000.

Sheiket Pasha, Mahmud (1857-1913), Turkish soldier and statesman, b. at Bagdad. After a brilliant military career he was appointed, in 1907, commander of the Third Army Corps stationed at Salonica. Here he embraced the political views of the 'Young Turks,' and from here, when the counter-revolution of April 13, 1909, broke out, he marched on Constantinople with his army and deposed the sultan, Abdul Hamid. From then till July 9, 1912, he was minister for war. For six months during the ministry of Kiamil Pasha he remained in retirement, but on the overthrow of that ministry by the *coup d'état* of Jan. 23, 1913, S. P. was appointed grand vizier. He was assassinated on June 11.

Sheikh, Arabian and Mohammedan title, used to designate chiefs or lesser magistrates. The word literally means an old man, and is a dignity that has no very precise significance; thus chiefs of tribes and heads of vils. are both called S.

Shekarry, *see* SHIKARI.

Shekel (Heb. *sheqel*), anct. E. weight and monetary unit. It is known from the Tel-el-Amarna tablets that in the fifteenth century B.C. the Babylonian system of money, etc., was in use in Syria and Palestine. This scale was 60 *Se.* = 1 mina; 60 minas = 1 talent. The ordinary S. weighed about 136 grains, but in the heavy measure this was doubled. In silver coinage 168 grains = 1 S., 50 *Se.* = 1 mina. Prof. Kennedy (Hastings, *Dictionary of the Bible*, in 420) calculates that the value of the ordinary gold S. was about £2 1s., that of the silver S. about 2s. 9d., but this varied somewhat at different times.

Shekinah, *see* SHECHINAH.

Shelburne, William Petty, Earl of, *see* LANSDOWNE MARQUESS OF.

Sheldon, Gilbert (1598-1677), Eng. prelate, b. at Stanton in Staffordshire. He was warden of All Souls' College, Oxford, for some years, and became chancellor of the univ. in 1667. He held various preferments in the church and became archbishop of Canterbury in 1663. He was an active and liberal promoter of the rebuilding of St. Paul's Cathedral, and he endowed and erected at his own expense the Sheldonian Theatre at Oxford, which was designed by Wren and completed in 1669. *See* M. Burrows, *Worthies of All Souls*, 1871, and life by V. Staley, 1913.

Sheldrake, or **Shieldrake** (*Podiceps tadorna*), handsome, brilliantly plumaged member of the duck family, found on flat coast., but often kept on ornamental water. The name refers to a shield-like patch on the breast. Its nest is often made in ot rabbit holes, and in it ten to twelve white eggs are laid. The drake is about 25 in. long, the head and neck are glossy green and the rest of the plumage is chiefly black and white, with

rich chestnut breast and bronze speculum. The flesh is coarse-flavoured.

Shell, tn. of Yorkshire, England, *see* under QUEENSBURY.

Shell, hard covering of a variety of animals, from that of the minute protozoan foraminifera, which through being deposited in myriads on the sea bottom form limestone rock, to the huge bony box covered with horny plates of the tortoises. The molluscs, however, show the most varied development of the S., though it is quite absent from a number of species, and only internal in others. It is secreted by the mantle or outer covering, and may be gelatinous, but is usually hardened by a deposit of carbonate of lime. It may be composed of a series of plates (chiton), single or cup-shaped (limpet), spiral (whelk), or bivalve (oyster).

Shell, *see* under AMMUNITION.

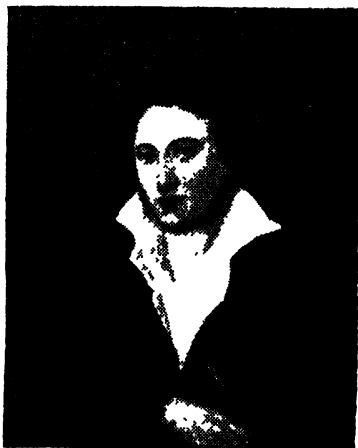
Shellac, *see* under PLASTICS.

Shelley, Mary Wollstonecraft (1797-1851), Eng. writer b. in London, the daughter of Wm. Godwin (q.v.) and Mary Wollstonecraft (q.v.) author of the *Rights of Women* (1792), and one of the first protagonists of female rights in England. Shelley had a considerable amount of correspondence with her father, and at his house encountered her when she was a young woman of about seventeen. They had not known each other very long when they eloped to the Continent, and finally settled in Italy. On the suicide of Shelley's first wife, Harriet, they were married (1816), and had one child. Mary S., though of a cold and calculating disposition, inherited the literary talents of her parents in a marked degree, was no mean critic of Eng. literature, was the authoress of *Frankenstein* (1818), a weird and powerful novel, for which she received £400, and in later life ed. the works of her husband. Her other works include *The Last Man* (1826); *The Fortunes of Perkin Warbeck* (1830); *Falkner* (1837); and *The Swiss Peasant* (1839). *See* lives by J. Marshall, 1889; R. Church, 1928; R. G. Grylls, 1938; and S. Norman, 1938.

Shelley, Percy Bysshe (1792-1822), Eng. poet, the eldest son of Timothy S., b. at Field Place, near Horsham, Sussex, on Aug. 4. He was educated at Eton, where he speedily earned a reputation for eccentricity. The boy showed himself an apt scholar, nevertheless, learning Gk. and Lat. with amazing rapidity, while he read omnivorously, and before his schooldays were over he had pub. two prose romances and also, in collaboration with his sister Elizabeth, a book of verse, *Original Poetry, by Victor and Cazire* (1810). Leaving Eton in 1810 he entered Univ. College, Oxford. S.'s academic career was destined to come to an abrupt end, for soon after matriculating he joined Thomas Jefferson Hogg, the biographer, in the production of a pamphlet, *The Necessity of Atheism* (1811), which gave so much offence that he was straightway sent down. Forbidden by his father to come home, he went to London, and here he grew intimate with a young girl, Harriet Westbrook, to whom he was married in Edinburgh in 1811. For a while thereafter the pair lived

at Keswick, S. meanwhile showing himself an ardent revolutionary in politics, championing the various insurrectionary movements going on in England and more especially in Ireland (1812). In the following year his *Queen Mab* was pub. privately, while about this time the poet began to disagree seriously with his wife, and in 1814 they finally parted. Mrs. Shelley formed another unhappy union and took her own life in 1816.

S. now married Mary Godwin (1816), and in the same year the poet issued his memorable work, *Alastor*, and also travelled in Switzerland and France. Returning to England, he became reconciled to his father who thereupon settled on



N.P.G.

PERCY BYSSHE SHELLEY
The portrait by Amelia Curran.

him a small but adequate income; and after living for some time at Marlow, and then near Windsor, S. and his wife proceeded to Italy, settling finally at Pisa. This first contact with Italy was a landmark in S.'s intellectual development. It was here that he composed *The Cenci* (1819); *Ode to the West Wind* (1819); *Prometheus Unbound* (1820); and *Rosalind and Helen* (1820); while at Pisa he produced many of his finest short lyrics, and also *Epipsychion* (1821), *Adonais* (1821), and *Hellas* (1822). Likewise he continued to champion the cause of freedom, alike in England and Italy, while he gave many hours of each day to study, read Gk. literature incessantly, mastered Sp., It., and Ger., and did trans. from Calderon, Dante, and Goethe. From Pisa he went to Ravenna, to stay with Byron, whose acquaintance he had made some years before. In June 1822, while sailing to Spezia, his boat foundered and he was drowned. For many days his body was missing, but at length it was found by his friend Trelawny, who cremated it on the

seashore, Byron being among the speculators. The ashes were taken to Rome and interred in that Protestant cemetery which S. himself had described as a place so lovely that 'it might make one in love with death.'

Despite early domestic misfortunes, S. was a man of singular integrity of character. Those who knew him, moreover, speak of the winning charm of his manner and personal appearance; and it is a matter for regret that, apart from a miniature done while he was a child and now in the Pierpont Morgan Library only one authentic portrait of him exists. It was done at Rome in 1819 by Amelia Curran, and is now in the National Portrait Gallery. In *A Defence of Poetry* (1821) S. declared his belief in poetry as a moral force of the highest importance, achieving its purposes by its appeal to the imagination and sympathies: 'The greatest instrument of moral good is the imagination; and poetry administers to the effect by acting upon the cause.' Many of his poems were reformative in aim; but, though these excited much contemporary interest and contain passages which stir the modern reader (such as his eulogies on freedom in *Hellas*), S. is remembered as the greatest lyric poet that England has yet produced. His experiments in poetic drama (apart from *The Cenci*) and his political hymns are insignificant beside such masterpieces as *Ode to the West Wind* (1819); *The Skylark* and *Autumn* (1820); and *Epipsychion* (1821). The last-named is regarded by many critics as S.'s supreme achievement in imagination and musical expression. *The Cenci* ranks S. among Englishmen the least distant from Shakespeare, but the unnatural horror of the tragedy renders it too monstrous for the modern stage. He was the possessor of an acute imaginative sympathy, and an ardent seeker for truths and ideals without which he felt that mankind could not fully live; these gave an added fire and depth to his brilliant cadences and to his sensitive descriptions of natural beauty, which, though richly detailed, always retain a peculiarly pure, ethereal quality. A vast literature has grown up around S., and among the ablest and most sympathetic tributes to his genius is an essay by Swinburne, while other poets who have written notable studies of the subject are Francis Thompson, Arthur Symonds, and W. B. Yeats. The best eds. of S.'s works are those ed. by H. Buxton Forman (1880), and by Roger Ingpen and W. E. Peck, the Julian ed. (1927-29) in 10 vols. See lives by T. Medwin, 1817; T. Hogg, 1858; T. L. Peacock, 1875; E. Dowden, 1886; W. E. Peck, 1927; R. Bailey, 1934; G. de Beer and S. Norman (*On Shelley*), 1938; E. Blunden, 1946; and N. Ivey White, 1947. See also A. B. Yolland, *Shelley's Poetry*, 1907; T. Shawcross (ed.), *Shelley's Literary and Philosophical Criticism*, 1909; A. H. Koszul, *La Jeunesse de Shelley*, 1910; A. Maurois, *Ariel*, 1923; L. Propst, *An Analytical Study of Shelley's Versification*, 1932; A. Sen, *Studies in Shelley*, 1936; A. M. O. Hughes, *The Nascent Mind in Shelley*,

1947 (early poetry and metaphysical and ethical ideas); and *Shelley in Italy*, an anthology by J. Lehmann, 1947. There is an attempt to classify every word in S.'s poetry according to its significance by F. S. Ellis in *A Lexical Concordance to the Poetical Works of Shelley*, 1892.

Shelley's Case, Rule in Eng. real property law before 1926. The rule was feudal in origin, is somewhat variously stated by such authorities as Coke and Preston, and has been the subject of much learned comment. The rule may be paraphrased as follows: 'When A takes an estate of freehold and, in the same conveyance, an estate is given (either with some other estate in between or without) to the heirs or the heirs of the body of A, the words "to his heirs" or "the heirs of his body" describe the estate which A takes and do not give anything to the heirs.' The rule only applied when an estate of freehold was first given to the person whose heirs were afterwards mentioned; thus, it did not apply to a gift 'in trust for A for fifty years, if he shall so long live, with remainder to his heirs' or to a gift to 'B for life with remainder to the heirs of A,' because in both these examples, on the termination of the first estate, the land would go to the person who had proved to be the heir of A after his death. The rule was a rule of law and not a rule for ascertaining the intention of the grantor of the land. It did not apply where the ancestor's estate was equitable and that of the heirs legal (see EQUITY); and it did not apply to an executory trust. The rule is now abolished by the Law of Property Act, 1925, which in effect provides that in the case of an instrument taking effect on or after Jan. 1, 1926, where an interest is given to the 'heirs' (or any class of heirs) of A, in words which would, before 1926, have given A a fee simple or an estate tail, the word 'heirs' operates as a word of purchase and not as a word of limitation marking out A's estate ('purchase' in this context means acquiring a title by deed, devise, etc., as opposed to bargain and sale for money). See also FEE; FEE SIMPLE; ESTATE; ESTATE; and CONTINGENT REMAINDER. See J. Williams, *Real Property* (21th ed.), 1926, and A. F. Topham, *Law of Property* (6th ed.), 1927.

Shellfish, popular unscientific name which includes such edible molluscs as the whelk and periwinkle, oyster and mussel, as well as crustaceans with a carapace, as the crab and lobster.

Shell Heaps, or Mounds, see KITCHEN MIDDENS.

Shell-shock, misleading and inaccurate term, widely used during the First World War to describe various neurotic syndromes, which are now recognised as anxiety states and anxiety hysterias. Its invention and adoption may well have been facilitated by the preoccupation of the public mind at that time with the recently learned effects of high explosive. While it is true that the onset of symptoms was, in some cases, associated with some specific incident, such as proximity to a shell-burst, many more occurred in areas remote from shell-fire. The

suggestion, seemingly implicit in such a term, that an important, or even essential, causal part was played by concussive trauma was as inaccurate as the picture which it tended to convey of a previously perfectly healthy individual being stricken down with dramatic suddenness. In the majority of cases the appearance of symptoms merely marked the point where the breaking stress had been reached after a prolonged period of tension, even if the latter had been unsuspected. The role played by any special incident was merely precipitant, and the true cause lay in repressed conflict between the 'id' and the 'super-ego,' i.e. between the individual's instinct of self-preservation and the demands of patriotic duty, loyalty, and self-respect. The heavy emotional charge investing such a conflict finally became too strong, was dissociated from it, and erupted into consciousness as 'free' anxiety. The latter, or its somatic 'attachments,' accounted for a variety of signs and symptoms, e.g. tremor, aphonia, paralysis, insomnia, amnesia, etc. These rendered the individual unfit for further service in the danger zone, revealing thereby their purposive aspect. Thus the original conflict had been solved in a manner involving no conscious guilt or loss of honour. See also HYSTERIA; PSYCHONEUROSIS; PSYCHOPATHOLOGY. See E. Miller, *The Neurosis in War*, 1940, and D. K. Henderson and R. D. Gillespie, *A Text-book on Psychiatry* (6th ed.), 1914.

Shell Transport and Trading Company, The, founded by the London merchant banking firm of Samuel Brothers in 1897 to take over its growing kerosene business, which concerned itself with the distribution of supplies throughout the Far E., and also with oil concessions in Borneo. In 1903 it became associated with the Royal Dutch Petroleum Company, which was also interested in the development of oil properties in the Dutch E. Indies, by the formation of the Asiatic Petroleum Company (changed in 1916 to Shell Petroleum Company), which merged their marketing organisations. In 1907 this association was followed by a full partnership between the Brit. and Dutch companies with the formation of the A.-S. Petroleum Company and B.P.M. (Bataafsche Petroleum Maatschappij). The S. T. and T. C. hold 40 per cent of the share capital of the three subsidiary companies and the Royal Dutch the balance.

Together with the Royal Dutch Company, the S. T. and T. C. holds a large or controlling interest in a large number of companies engaged in petroleum exploration, production, refining, transportation, and marketing. The group's sources of oil are Venezuela, U.S.A. (Gulf, California, and mid-continent), Brit. Borneo, Indonesia, Egypt, Colombia, Trinidad, Iraq, Argentina, Netherlands, and Germany, and large interests are held in such well-known companies as Venezuelan Oil Concessions, Canadian Eagle, Mexican Eagle, United Brit. Oilfields of Trinidad, and Anglo-Egyptian Oilfields. The authorised capital of the S. T. and T. C. is £63,000,000; issued capital £55,611,757.

made up of £2,000,000 first preference, £10,000,000 second preference, and £43,611,757 ordinary stock; the unissued capital is in 100,000 first preference shares of £10 and 6,388,243 ordinary shares of £1, each of which, when fully paid, will be converted into stock.

Shelta, language of the Irish gipsies and of tinkers and gipsy-folk elsewhere. It is a very ancient and mysterious tongue. According to Dr. Kuno Meyer this hybrid tinker language has its origins in the early Irish. It is made up of perversions and inversions of legitimate words, and draws on Eng. as well as Irish for its vocabulary.

Shemakha, tn. of the Azerbaijan S.S.R., 70 m. N.W. of Baku. It was the old cap. of Shivan, and was known to Ptolemy, the Rom. geographer, as Kamachia, and still contains the palace of the khans in spite of frequent earthquakes. Chief industries are the rearing of silkworms (though this has declined), and the manuf. of silk, soap, dyes, bricks, and leather. Pop. 23,000.

Shenandoah: 1. Riv. of Virginia, U.S.A., a trib. of the Potomac, which joins it at its passage through the Blue Ridge, after a course N.E. of 200 m. 2. Bor. of Schuylkill co., Pennsylvania, U.S.A., 10 m. from Pottsville. The chief industries are the mining and the shipping of anthracite. Pop. 19,700.

Shenchowfu, see CHENCHOWFU.

Shensi, N. prov. of China, S. of the Great Wall. It has an area of 72,900 sq. m., and consists of two parts separated from each other by a barrier of mts., which runs across the S. portion of the prov. from E. to W. To the N. of the mts. is the valley of the Wei or Yellow R., which forms the great channel of communication between E. China and Central Asia. S. is essentially an agric. prov., and produces large quantities of cotton, wheat, and opium, but kaoliang, pulse, barley, millet, maize, groundnuts, beans, lucerne, and rape seed are also grown. Coal is mined in the N. of the prov. Petroleum is worked, and oil is extracted from shale beds. The N.W. univ. is in the prov. Cap. Sian. Not long before the Second World War began the Jap. invaders occupied S., but at the time of the Jap. surrender in 1945 the Chinese Communists virtually held the prov., having won control by a steady infiltration of the Jap. lines, though the invaders remained in control of the railways and large towns. The prov. was completely in Communist hands by early 1949. Pop. 9,492,000, including many Muslims.

Shenstone, William (1714-63), Eng. poet, b. at Halesowen, Worcestershire. He studied at Pembroke College, Oxford, where he was a contemporary of Dr. Johnson. He began writing at an early age, and while still at Oxford wrote a mock-heroic poem, *The Diamond*, which was privately printed in 1733. *Poems upon Various Occasions* was pub. in 1737, and this was followed by *The Judgement of Horatio* (1741) and *The Schoolmistress* (1742), both anonymously. After 1745 S. took up landscape gardening which earned him a wider reputation than his poetry.

His works were pub. in three vols. (1761-1769) ed. by R. Dodsley. See lives by R. Graves, 1788; H. S. Crazebrook, 1890; E. M. Purkis, 1931; and R. Humphreys, 1937. **Sheël**, see **HELL**.

Shepard, Ernest Howard (b. 1879), Eng. artist and cartoonist, b. in London, and educated at Heatherley's and Royal Academy schools. He first exhibited in the Royal Academy in 1901, and began contributing drawings to *Punch* in 1907. During the First World War he was commissioned by the Royal Artillery and awarded the M.C. He was elected to the *Punch* Table in 1921. S. has won fame with his delicate, whimsical illustrations; apart from his *Punch* cartoons his best-known pubs. include the illustrations for A. A. Milne's *Winnie-the-Pooh*, 1926; *Enrybody's Popsy*, 1926; Kenneth Grahame's *The Golden Age*, 1928, and *The Wind in the Willows*, 1931, and Laurence Housman's *Victoria Regina*, 1934.

Shephelah, see under **PALESTINE**.

Shepherdia, or **Rabbit Berry**, deciduous shrub, family *Elaeagnaceae*, with tapering silvery leaves and yellow flowers in spring which are succeeded, in the female flowers, by scarlet edible berries.

Shepherd Kings, or **Hyksos**, see **EGYPT**, *The Hyksos*.

Shepherd of Hermas, see **HERMAS**.

Shepherd's Bush, residential suburb in the W. of London, England, the site of sev. international exhibitions. At Lime Grove are large B.B.C. television studios.

Shepherd's Dog, see **OLD ENGLISH SHEEP-DOG** and **SHEPHERD SHEEP-DOG**.

Shepherd's Purse (*Capsella Bursa-pastoris*), extremely common cruciferous plant characterised by its two-valved seed pouches. The plant is extraordinarily adaptable, and, being self-fertilised, is able to flower and seed the whole year round.

Shepherds, The Loyal Order of Ancient, friendly society, estab. 1826. Its registered offices are at 132 High Street, Chorlton-upon-Medlock, Manchester, and it has branches in most tns. in the United Kingdom. The objects of the society are to give relief in distress, funeral benefits, and sick pay. In 1918 it had a membership of 269,991, and its funds amounted to £2,908,720.

Sheppard, Hugh Richard Lawrie (1883-1937), Eng. cleric, son of Canon Edgar S., was educated at Marlborough and Cambridge. Secretary to bishop of Stepney, and curate at St. George's, Manover Square. In 1911 S. served as a chaplain in France, and became, in the same year, vicar of St. Martin-in-the-Fields, London, where his progressive methods soon made his name known everywhere. He resigned in 1927, and in 1929 became dean of Canterbury. He was prominent in forming the Peace Pledge Union. He wrote *The Human Parson* (1924); *The Impudence of a Parson* (1927); and *My Hopes and Fears for the Church* (1930). See R. E. Roberts, H. R. L. Sheppard: *Life and Letters*, 1942; and C. H. S. Matthews, *Dick Sheppard: Man of Peace*, 1948.

Sheppard, Jack (1702-24), Eng. criminal, b. at Stepney, London, apprenticed to a

carpenter, but fell into bad company and became a thief. In April 1724 he was committed to St. Giles's roundhouse, but contrived to make his escape, and, captured again in May, broke out of Newgate Prison. In July he was again caught, and in the following month was tried and condemned to death. Again he escaped, and yet again, but was caught drunk, and watched day and night until his execution at Tyburn on Nov. 16. He was a popular hero, and Ainsworth made him the subject of a novel. He figures also in H. Fielding's *Jonathan Wild*.

Shepparton, commercial and industrial city of Victoria, Australia, on the Goulburn R. in the heart of the Goulburn Valley irrigation dist., 113 m. N. of Melbourne. It has fruit canning, butter, bacon, tomato, lamb processing, and other factories. Three newspapers are pub. in S., and there are two radio stations. The city has kindergarten, primary, and high schools, and an art gallery and library. There are 1000 ac. of parklands. Pop. (city) 10,000; (40 m. radius) 80,000.

Sheppey, Isle of, dist. on the N. coast of Kent, England, at the mouth of the R. Medway. It is 11 m. long and 4 m. wide, with a flat surface upon which seed crops are grown and sheep reared. Sheerness is the chief tn. Area 35 sq. m. Pop. (rural dist.) 7800.

Shepstone, Sir Theophilus (1817-93), Brit. S. African statesman, b. at Westbury, near Bristol. He was Kalir interpreter at Cape Town, 1835, and Brit. resident among the Congo and Fingo tribes in 1839. Having held the position of agent for the native tribes of Natal in 1845 he was made secretary for native affairs in 1856, and while holding this position encouraged the continuance of native customs. He is chiefly remembered, however, as the administrator of the Transvaal, which he annexed in 1877 and governed until 1879.

Shepton Mallet, mrkt. tn. near Wells, Somerset, England, with stone quarries, breweries, and shoe manufacturing. The second-century par. church has a unique carved oak roof, containing 350 panels and 350 bosses all carved with different designs. It has a market cross (1500). Pop. 4800.

Sheraton, Thomas (1751-1806), Eng. furniture maker and designer, b. at Stockton-on-Tees, pub. *The Cabinet-Maker and Upholsterer's Drawing Book* (1791), and *The Cabinet Dictionary* (1803). The heyday of cabinet-making in England is associated with the name of S. and his three contemporaries, Chippendale, Hepplewhite, and Adam. They raised the manufacture of furniture to an art. S. was an advocate of a severer style in Eng. cabinet-making, although some of his more fanciful designs verged on the exotic. See R. Edwards, *Sheraton Furniture Designs*, 1948.

Sherborne, mrkt. tn. of Dorsetshire, England, 6 m. E. Yeovil. It possesses the superb abbey church of St. Mary the Virgin, which, founded by St. Ealdhelm in the eighth century, still contains traces of Saxon work. Early in the

twelfth century the Saxon building was replaced by a Norman church, and much of this structure is still standing. In the fifteenth century the Norman choir was demolished, and replaced by the Perpendicular choir with its beautiful fan vaulting. The nave was also rebuilt at this period. The public school was founded by Edward VI. in 1550, and there are sev. other important schools in S., including the public school for girls. The old castle is a Norman structure, now in ruins, and S. castle was built by Raleigh. The chief occupations of S. are agriculture, gloving, and education. There is a silk-weaving mill, built in 1740 by Huguenot refugees. Pop. 7800.

Sherbrooke, Robert Lowe, first Viscount (1811-92), Eng. statesman, b. at Bingham Nottinghamshire; he was educated at Winchester and Oxford, and was called to the Bar in 1842. He went to Sydney in the same year, becoming a leading advocate there, and in the following year was elected a member of the legislative council of New South Wales. In 1850 he returned to England, where he became a leader-writer on *The Times*. In 1852 he entered and was joint-secretary of the Board of Control, 1852-55, and vice-president of the Board of Trade, 1855-58. In 1868, the year in which he sat as the first member for London Univ., he became chancellor of the Exchequer under Gladstone, and held that high office until 1873, when he went for a short time to the Home Office. In 1879 failing health compelled his retirement into private life, and when Gladstone returned to power in the following year, he bestowed a peerage upon his erstwhile able lieutenant. Lowe was a brilliant and epigrammatic speaker, and an admirable debater. See lives by S. F. Hagan, 1893, and A. Patchett Martin, 1893.

Sherbrooke, city of Quebec, Canada, at the junction of the Magog and St. Francis rivers, 100 m. E. of Montreal. S. is in the heart of an agric. and dairying area, and mining and lumbering are carried on near by. It has cellulose, asbestos, paper, machinery, and cloth-making industries. Pop. 42,000.

Sherburn, tn. in the E. Riding of Yorkshire, England, chiefly engaged about agriculture. Its old church, rebuilt in 1912, still retains some Norman parts. Pop. 700.

Sher Ali, see AFGHANISTAN.

Sheroff, see SHERIF.

Sherghat, Battle of, fought on Oct. 30, 1917, during the operations following the Brit. occupation of Bagdad in March of that year, resulting in a Brit. victory over the Turks.

Sheridan, Caroline Elizabeth Sarah, see NORTON.

Sheridan, Richard Brinsley (1751-1816), Irish dramatist and politician, b. in Dublin, son of Thomas S., an actor. Educated at Harrow, his popularity indicated an agreeable disposition, though he appears to have been an indifferent scholar. In 1770 his family moved to Bath. Here, after an unsuccessful attempt at literary collaboration with Nathaniel Halhed, he married his first

wife, Elizabeth Linley. The couple settled in London at Orchard Street, and were soon accepted in society.

S. now turned his hand to play-writing, and in 1775 *The Rivals* was produced at Covent Garden; it estab. his reputation. The following year he acquired a share in Drury Lane Theatre, and in 1777 produced there *The Duenna*, an opera with music by his father-in-law, Thomas Linley, and *The School for Scandal*. The latter play is regarded by many as the most brilliant comedy of manners in the language. It was followed by *The Critic* (1779).

Social success had come easily to S. and his young wife, but the position was really



N P G.

RICHARD BRINSLEY SHERIDAN
The painting by John Russell.

untenable, and it was to the ultimate benefit of the erstwhile poor player's penniless son that he had won the acquaintanceship of Burke and Fox through Dr. Johnson and the members of the Literary Club. From writing political essays, S. seems soon to have diverged into politics proper. Through the interest of Fox in 1780 he entered Parliament, warmly supporting the Whigs, and was under-secretary for foreign affairs in 1782 and secretary to the Treasury in the coalition ministry of 1783, though he had next to none of the high qualities of a statesman nor any striking ability in debate. He was at this time an intimate associate of the Prince of Wales. He was treasurer of the navy in the 'All the Talents' administration, 1806-7, and in his last years was receiver of the duchy of Cornwall.

In 1792 Mrs. Sheridan died, and three years later S. married Esther Jane Ogle, daughter of the dean of Winchester, sold

his shares in Drury Lane, and settled at Polesden in Surrey. In 1799 his last play, *Pizarro*, was produced; it was an adaptation of Kotzebue's *Spaniards in Peru*. George III. was right when he described it as 'a very poor composition'; but it was a success. The end of his life was darkened by financial difficulties and by sickness. At his death he seems to have endured poverty bordering on destitution; he was buried in Westminster Abbey.

In politics S. lacked the high qualities of a statesman, though he distinguished himself as an orator during the impeachment of Warren Hastings (1787). As a dramatist he is among the greatest, his fame resting chiefly upon *The Rivals* and *The School for Scandal*. *The Critic*, though it is very witty, is scarcely more than a parody. A master of construction, his situations were well conceived, and his humour and dialogue excellent. *The School for Scandal* is a brilliant compromise between the new sentimental drama, which followed the Restoration drama, and the old Eng. comedy of manners. If S. had less sympathy with human nature than Goldsmith or George Colman and lacked the art of rendering normal traits of character humorous in abnormal circumstances, he certainly reveals a deeper insight into human nature than his predecessors, besides displaying a greater mastery of technique.

See lives by T. Moore, 1825; Mrs. Oliphant (Eng. Men of Letters series), 1902; W. Siebel, 1909; E. M. Butler, 1931; W. A. Darlington, 1933; and L. Gibbs, 1917. See also R. C. Rhodes, *Some Aspects of Sheridan Bibliography*, 1928, and *Harlequin Sheridan: the Man and the Legends*, 1933.

Sheridan, mt. of the U.S.A., 22 m. from the outlets of Yellowstone Lake. Alt. 10,385 ft.

Sherif, or **Shereef**, title given to the descendants of Mohammed through his daughter Fatima and Ali. These have the privilege of wearing the prophet's colour - green; the women wearing green veils and the men green turbans.

Sheriff, and **Sheriff Courts**. In the Norman judicial and financial administrative system the S. (O.E. *scir-garfa*, shire-reeve) was the accredited representative of the central authority and the special nominee of the king. The rise of the S. probably dates from the end of the tenth century, and the office reached the zenith of its influence under the Norman kings. There were Ss. for every co., and in each the S. was civil president of the shire-moot (O.E. *scir-gemot*), executor of the law, captain of the fyrd, and steward of the royal demesne (Langmead). The S. also kept a court leet (*q.r.*) biennially in each hundred (*q.r.*), called the S's court, the object of which court was to relieve the shire-moot or co. court of a part of the great number of small criminal cases annually tried there. The office of S. was open to grave abuses. Although the S. was the means of exerting the royal authority, he could yet impede it, especially when he was a powerful baron. Henry I. abolished these baron-Ss., and substituted officials of the

royal household to hold office for one year subject to good behaviour. Moreover, the S.'s activities were made henceforward subject to careful scrutiny by the Exchequer. By the Provisions of Oxford (1258) the yearly tenure of office was confirmed. With the elaboration of administrative machinery the importance of the S. continued to decline. From the time of Philip and Mary the office of S. was purely civil, and it was in 1557 that lords-justices were first appointed to act as the chief military officer of the co. The chief duties of the S. at the present day are (1) 'to act as returning officer for co. elections and to publish election petitions; (2) to suppress riots, having power in that connection to call out the *posse comitatus* (*q.r.*); (3) to carry out sentences of death; (4) to summon juries for the high court; (5) to attend judges on circuits and provide them with suitable police and escort; and (6) to execute all writs and processes of the high court. The appointment of Ss. is regulated by the Sheriffs Act, 1887, which made the mode of appointment uniform throughout England and Wales. The chancellor of the Exchequer, together with the judges of the high court, attend usually in Nov. to consider the excuses of those substantial co. landowners who have been previously selected by the circuit judge as fit for the office of S. Three are selected by the above tribunal for each co., and the list is then submitted to the king for approval. No person may be chosen twice in three years if there be any other qualified person in his co. All Ss. habitually appoint under-Ss. to act as their deputies, and the latter appropriate all the fees of office.

In the U.S.A. the S. is a co. official, generally popularly elected, being a resident of the co. His duties can be compared with those of the police in Eng. The S. is responsible for guarding prisoners and juries, attending the local sessions, serving their processes and executing their judgments. His chief judicial function lies in the determining of writs of inquiry or damages.

Sheriff Courts. - From the institution in 1816 of the co. courts till the present time, the S. has continued to exercise civil jurisdiction by virtue of his constitutional position as president of the court of his co. His court still exists, but as a court distinct from the modern co. court. The prin. matters dealt with in the S. court are assessment of compensation to landowners under the Lands Clauses Acts (*q.r.*), assessment through a jury of damages in such common law actions as breach of promise of marriage, holding elections, and execution of writs (Sheriffs Act, 1887, section 18). In Scotland the S. remains the chief local judicial officer of his co.; though in practice the S. substitute performs his judicial duties, and is generally called the S. The qualification as three years' standing at the Bar as an advocate. He holds office for life, or until and unless removed for misconduct. The S. court is the prin.

local court in Scotland. Its jurisdiction is both civil and criminal: in civil cases the jurisdiction is now unlimited in regard to the money value of the cases; on the criminal side the court has cognisance of all serious crimes excepting murder, rape, and treason, but the power of punishment is limited to fine and imprisonment, and does not extend to penal servitude. The civil jurisdiction embraces all civil matters not expressly assigned to other courts. Questions affecting status are outside the S.'s province, e.g. the S. has no power to decide a question of legitimacy. His ministerial and other duties as to returning juries, writs for elections, and suppressing riots are similar to those of the Eng. S. The S. clerk is the clerk of the S. court, and his duties correspond closely to those of a registrar in the Eng. courts. See also JUSTICIARY, HIGH COURT OF. See W. Stubbs, *Constitutional Documents from the Beginning to 1307* (vol. II.), 1875; W. Morris, *The Medieval Sheriff*, 1927; and Sir F. M. Stenton, *Anglo-Saxon England and English Feudalism, 1066-1155*, 1943.

Sheriffmuir, scene of an indecisive battle in 1715 between the Jacobites under the earl of Mar and the Hanoverians under the duke of Argyll. It is on the N. slope of the Ochills, Perthshire, about 3 m. from Dunblane.

Sherman, William Tecumseh (1820-91), Amer. general, b. at Lancaster, Ohio, and educated there and at West Point. He served in Florida against the Seminole Indians, and in the war with Mexico (1846-48), but resigned from the army in 1853 to conduct a banking business at San Francisco. He joined the N. on the outbreak of the Civil war, and after taking part in the battles of Bull Run (1861) and Shiloh (1862), was in 1863 made head of the army of the Tennessee, and in 1864 commander of the military div. of the Mississippi. He took Atlanta on Sept. 1, 1864, and later in the same year abandoned his base and marched 300 m. across Georgia to the sea. In 1865 he again abandoned his base and marched to Richmond, defeating Johnston and co-operating with Grant. Johnston surrendered to S. in April 1865, thus bringing the war to an end. See lives by W. F. Johnson, 1891, and B. H. Liddell Hart, 1929. See also G. W. Nichols, *The Story of the Great March, 1865*, and Sir J. Kennaway, *On Sherman's Track*, 1867.

Sherman, tn. in Grayson co., Texas, U.S.A., with trade in corn and cotton. Pop. 7200.

Sherman Anti-trust Act (1890), passed by the Congress of the U.S.A. with the intention of breaking up the greedy monopolies of the day. The Act was named after John Sherman (1823-1900), Amer. financier and Republican statesman, who was largely concerned in the enactment of the Anti-trust Bill during the presidency of Benjamin Harrison. The Act forbade 'every contract, combination in the form of trust or otherwise, or conspiracy, in restraint of trade or commerce among the sev. states, or with foreign nations,' and declared it to be an offence to 'establish or attempt to establish a monopoly, or

to combine or conspire . . . to establish a monopoly of commerce between the sev. states or in the foreign nations.' It offered sev. modes of enforcement with severe penalties, but accomplished little. At the outset the courts had a difficulty in interpretation (whether the Act applied to all contracts in restraint of trade or only to those 'in unreasonable restraint of trade'), and they therefore tended to liberality of interpretation. Successive presidents, too, failed to enforce the Act, sev. states passed enactments which helped the trusts to evade it, and in 1895 the supreme court, in a decision in favour of the 'sugar trust,' gave the anti-monopoly forces a stinging defeat. After that the trusts grew in size, in numbers, and in arrogance. President Wilson tried thereafter to check the growing power of the trusts by the creation of the Federal Trade Commission and the passing of the Clayton Act. But his endeavours were cut short by the outbreak of the First World War. See A. Nevins, *A Brief History of the United States*, 1942.

Sheriff, Robert Cedric (b. 1896), Eng. playwright, b. at Aylesbury. Educated at Kingston grammar school. He entered the Sun Insurance Office, 1914. Served in the First World War as officer in the E. Surrey Regiment, and was wounded at Ypres in 1917. His first London production was *Journey's End* (a faithfully realistic play of life in the trenches). It was a success at the Savoy, where it was staged in Jan. 1920. *Badger's Green* (dealing with modern vul. problems) followed in 1930. *Windfall* was produced in 1933. S. has also written the screen plays of many famous books. He is a fellow of the Society of Antiquaries, and organised the excavation of the Roman villa at Angmering, Sussex, shortly before the Second World War. Later pubs. include *Greengates* (1936); *The Hopkins Manuscript* (1939); *Another Year* (1948); and *Miss Mabel* (1949).

Sherrington, Sir Charles Scott (b. 1861), Eng. physiologist, b. in London and educated at Caius College, Cambridge. After lecturing on physiology at St. Thomas's Hospital, London, and receiving the Royal and Copley medals of the Royal Society, S. was prof. of physiology at Liverpool Univ., 1895-1913. In 1913 S. was appointed Waynflete prof. of physiology in the univ. of Oxford. He held a professorship at the Royal Institution, 1914-17, was prof. of pathology at London Univ., and Gifford lecturer at Edinburgh Univ., 1936-38. He was a sometime member of the Medical Research Council, and president of the Brit. Association in 1920. S. received the Order of Merit in 1924, and in 1932 he was awarded the Nobel prize for medicine jointly with Edgar Douglas Adrian. His greatest contribution to physiology lay in his study of the physical basis of mind; he anticipated Pavlov in the discovery of the nervous phenomenon labelled by the latter a 'conditioned reflex' (see BEHAVIOURISM; PAVLOV). Pubs. include *The Integrative Action of the Nervous System* (1906); *Mammalian Physiology* (1916), various papers to the

Royal and other scientific societies, especially on the brain and nervous system; *Selected Writings* (1929); and *Man on his Nature: the Gifford Lectures* (1940).

Sherry, dry Sp. wine from the vineyards of southern Spain, chiefly round Jerez de la Frontera (q.v.). The name S. comes through the Elizabethan 'sherris' (singular taken as plural) from Xeres, as the name of that tn. was formerly spelled. The chief types are Fino, a dry wine, Oloroso, much sweeter, and Manzanilla, made much nearer the sea, extremely dry, with an almost salty taste which has never been copied elsewhere. S. grapes, after being picked, are spread out upon grass mats, which causes the moisture to be sucked up, thus eventually making a stronger wine. The making of S. is unique in that younger wines are bred with older wines on what is called the Solera system, so that vintage years are unknown, the aim being to produce a type which never varies from year to year. Unlike port, where grape spirit is added to check fermentation, the finished wine in S. receives an addition of local brandy, when the wine is completely finished, to enable it to withstand the journey to foreign countries.

s'Hertogenbosch, see HERTOGENBOSCH.

Sherwood, Mary Martha (1775-1851), Eng. author, b. at Stanford, Worcestershire. She married an officer in the Brit. Army, and spent some time in India. Her best-known work is *The History of the Fairchild Family* (1818). She wrote over three hundred now forgotten books, many of them novels; others, such as *Sabbaths on the Continent* (1835), are records of her reactions to other people's religious outlook. Through most of her voluminous works ran the theme of human depravity. Her attitude to classical art and classical literature was less indifferent than hostile. Yet despite her narrowness, she was a gifted woman, though prejudiced, didactic, and arrogant in her views. See J. W. Darton, *The Life and Times of Mrs. Sherwood*, 1910, and Naomi Royde Smith, *The State of Mind of Mrs. Sherwood*, 1947.

Sherwood, Robert Emmet (b. 1896), Amer. playwright, b. at New Rochelle, and educated at Harvard. He was editor of *Life* from 1921 to 1928, and dramatic critic to that periodical and to *Scribner's Magazine*. S. has written a number of plays, some of which have been filmed. His first, *The Road to Rome* (1927), is a satire on Hannibal and war. *Waterloo Bridge* (1930) has its theme in a chorus girl turned prostitute, who refuses to yield to an Amer. soldier lest she destroy his chivalric illusions. *Reunion in Vienna* (1931) is on the motif of the exiled Hapsburgs. In 1934 he produced *The Petrified Forest*, a melodrama on frustrated lives; and in 1936 *Idiot's Delight*, on the theme of world peace. For this last-named play he was awarded a Pulitzer prize, and won it again in 1938 with *Abel Lincoln in Illinois*, and for a third time with *There shall be No Night* (1940), dramatising the Russian invasion of Finland. He was awarded the gold medal for drama of the Amer. Academy of Arts and Letters (1940)

and he also received awards for the best screen play of 1947, *The Best Years of our Lives*, from Motion Picture Academy and the International Film Festival (Brussels). Other works: *Unending Crusade* (1932), *Acropolis*, and *The White House Papers of Harry Hopkins* (1918).

Sherwood Forest, anc. royal woodland, near Mansfield and Nottingham, the favourite abode of Robin Hood, Maid Marian, etc.

Sherwood Foresters (Nottinghamshire and Derbyshire Regiment), the 1st Battalion was the old 45th Regiment of Foot, and its records before 1740 are those of the 56th Foot, or 'Green Marines,' raised in the reign of George II. After that time the 45th Foot was mainly recruited from Nottinghamshire, and was confirmed in its title of the 45th Foot. It received its present designation of S. F. in 1881. On the army reorganisation of 1881 the 45th was listed with the 95th (Derbyshire) Regiment, which had been formed in 1824. It fought at Louisburg, in most of the great battles of the Peninsular war (its sobriquet of 'the Old Stubbons' is due to its bravery at Talavera), and the chief battles of the Crimea; and its other pre-1914 battle honours also include central India, Egypt (1882), Firoz, and the S. African war (1899-1902). In the First World War the S. F. recruited, besides four regular and special reserve battalions, four territorial force and seven service and garrison battalions. The 2nd Battalion was part of the original B.E.F. (q.v.), and fought at the Aisne. The 1st Battalion, in 1915, fought in the Ypres salient, notably at Hooge in repelling a liquid fire attack, and at the Hohenzollern Redoubt. Territorial battalions fought at Beaumont-Hamel, Thiepval, and Contalmaison in the Somme battles of 1916; while the 2nd Battalion fought, along with the Guards, near Boulton Wood. In the following year territorial force battalions lost many men in the fighting at the quarries S. of St. Julien. Equally severe casualties were suffered in the fighting near Clercy in 1918 by the 15th Service Battalion during the attack on the 7th Corps. The 1st Battalion distinguished itself in the Villers-Bretonneux area; while in the Lys battle the Sherywoods were conspicuous around Neuve-Eglise and near Kemmel, taking part in the attack on the Hindenburg line and in the battle of the Selle. In the Second World War the S. F. fought in N. Africa and on the It. front, in most of the great battles of the Eighth Army.

Sheshong, see SHANSHANG.

Shetland, or Zetland, group of 19, off the N. coast of Scotland, of which they form a co. They number over 100, only 28 being inhabited. They lie some 50 m. to the N.E. of Orkney, between the Atlantic on the W. and the North Sea on the E. The prin. is. is Mainland; it is 54 m. long and 21 m. wide, with a pop. of 16,000; others are Yell, Unst, Fetlar, Whalsay, Bressay, Trond, E. and W. Burra, Papa Stour, Muckle Roe, Foula, and Fair Isle. The is. are for the most part bleak and hilly, the greatest elevation being Ronas

or Roeness Hill (1475 ft.) on Mainland. There are a number of lakes and streams, and the coast is much indented and the scenery very fine. The chief headlands are Sumburgh Head, and Fitful Head where Sir Walter Scott's propheticess in *The Pirate* was supposed to dwell, E. Burra being the scene of the novel. The spring is very late, and while the summer is practically without night, the winter days are only 6 hrs. long. The well-known shaggy S. ponies are bred in large numbers, also a breed of small cattle, and sheep with very fine wool which is plucked by hand. Peat-cutting is carried on. Oats and barley are the chief crops, with potatoes and turnips. The main industry is fishing; herring, cod, and ling being the prin. catch. Whales are found in the bays, and the grampus, dolphin, porpoise, and seal are seen off the coasts. Knitted goods are manufactured. Unst is the centre of the trade in fine S. woollens, which are famous; gloves, shawls, and velts are the prin. goods. At Fair Isle (*q.v.*) the southernmost is., which lies some 25 m. distant from the Orkneys and from the remainder of S., hand-knitted goods of elaborate design are made; there is a bird observation station. Steamers from Leith and Aberdeen call at Lerwick, the cap., on Mainland, twice a week, and at Scalloway and other places once a week. S. combines with Orkney (*q.v.*) to send one member to Parliament. The word S. is from the old Norse *Hjaltland*, 'highland,' or 'Hjalt's land.' Traces of early inhab. are found in numerous *brochs*, of which the finest specimen is to be found on Mousa. A Bronze Age vil. excavated at Jarlshof, Sumburgh Head, is of much interest. There is evidence to show that S. was visited by the Romans; it was inhabited by the Scandinavians, Harold Haarfager annexing the is. to Norway in 875, and they remained under Norse rule until the time of James III. in 1469. Area 352,319 ac. Pop. (1939) 19,800. See C. Rampini, *Shetland and the Islanders*, 1840; G. Low, *Tour through the Islands of Orkney and Shetland* in 1774, 1879; S. R. Cowie, *Shetland*, 1897; E. W. Hardy, *The Land of the summer dim*, 1913; A. W. Brügger, *Ancient Emigrants*, 1929; W. Fordyce Clark, *Shetland Sketch Book*, 1930; W. Moffatt, *Shetland*, 1934; R. Perry, *Shetland Sanctuary*, 1948; and P. Jamieson, *Letters on Shetland*, 1949.

Shetland Pony, see under *Horse*.

Shetland Sheep-dog, breed of dog which originated among the crofters of the Shetlands. It was of varied size and appearance, until definite rules of breeding were laid down. It is similar to a collie, but does not stand higher than 15 in. at the shoulder. In 1914 a club was formed to improve the standard of its breeding, and the Kennel Club gave it a place in its registers.

Shias, see *SHITES*.

Shibboleth, Heb. word by the pronunciation of which it was possible to tell an Ephraimite from a member of the other tribes, on account of his inability to pronounce the *h*. For the occasion of the use of this test, see Judges xii. 4-6. It has now come to mean a party catchword.

Shidzuoka, city in the prov. of Suruga, Japan, 95 m. S.W. of Tokyo, centre of the tea trade. Pop. 80,000.

Shiel, Matthew Phipps (1865-1947), Brit. journalist and novelist, b. in the W. Indies of Irish descent. His best-known book is *The Purple Cloud* (1901). Other books: *Shapes in the Fire* (1896); *The Dragon* (1913); *Children of the Wind* (1924); and *Dr. Krasinski's Secret* (1930). *Collected Poems* appeared in 1936.

Shiel, Loch, lake of Scotland on the boundary between Inverness-shire and Argyllshire. It is 17 m. long, but only 1 in. broad, with a maximum depth of 420 ft. There is a plaque at Glenfinnan, marking the spot where Charles Edward Stuart struck his flag, Aug. 19, 1745.

Shield, William (1748-1829), Eng. musician, b. at Swallowell, near Newcastle. He was prin. violin at the It. Opera in London for eighteen years, and for a time composer to Covent Garden Theatre. In 1817 he was appointed master of the king's music. He produced comic operas and dramatic works, e.g. *Rosina*, *The Mysteries of the Castle*, etc., as well as glees and songs, notably *The Archers*, *The Heaving of the Load*, and *The Post Captain*.

Shield, piece of defensive armour worn on the arm which does not wield the offensive weapons (generally, therefore, the left) in order to protect the body of the wearer. The S. of the Bronze Age were of hammered work, circular, generally with a boss in the centre and a handle opposite it on the inside. Of the S., it is generally thought that the Homeric form was shaped like the figure eight, and made of ox hide, whilst the later Gk. S. were small, and round or oval in shape. The practice of having a device on the S. was in vogue in the fourth century B.C. The early Rom. S. were round, whilst the *scutum* of the Punic wars was oblong; the cavalry carried a light S., and in later times a somewhat heavier one. The early Eng. S. were 'bucklers' of lindenwood, with iron ribs and bosses, and of a considerable size. Another form was convex and circular, with a very sharp boss. S. bosses are frequent relics from Saxon graves. The Norman S. were long and kite-shaped; they had straps for the arm on the inner side and also a strap for the neck. During the twelfth century S. became flatter at the top, and armorial bearings were then generally adopted.

See S. Laking, *European Arms and Armour*.

Shield, in heraldry, the escutcheon or field on which the armorial bearings in coats of arms are placed or blazoned. It was derived from the old military protective shield used by knights in warfare, painted to distinguish one from another. S., except in the case of peeresses in their own right, single ladies, and widows, by whom the lozenge only is used, are of various forms. See also under *HERALDRY*, *The Shield and its Parts*.

Shield Fern, see *ASPIDIUM*.

Shieldrake, see *SHIELDRAKE*.

Shields, North, seaport and mark. tn. of Northumberland, England, at the mouth of the R. Tyne, opposite to S. S., with

which it is connected by steam ferry, shipbuilding is carried on, and cables, anchors, rope, chemicals, plastics, furniture, etc., manufactured; it exports coal and coke. Fishing is largely carried on, there being an extensive fish quay. The harbour is enclosed by two piers. N. S. is included in the co. bor. of Tynemouth (q.v.).

Shields, South, seaport and a parl. and co. bor. at the N.E. extremity of the co. of Durham, England. It is 20 m. N.N.E. from Durham, 9 m. from Newcastle-on-Tyne, and 275 m. from London. It is connected with N. S. and Tynemouth by steam ferry. The tn. owes its importance mainly to its commanding position at the mouth of the R. Tyne. The development of modern S. S., as of every other Tyneside tn., is in some measure due to the work of the Tyne Improvement Commission. The two piers (N. and S.) at the harbour entrance, were built by the commissioners in 1852. They are sea works of great magnitude, and make the Tyne a perfect harbour of refuge. Tyne Dock, acquired in 1937 by the commissioners from the L.N.E.R., is one of the prin. docks on the N.E. coast, and whilst the main classes of cargo handled are coal, timber, pit props and iron ore, the dock is fully equipped to deal with all types of merchandise. The corporation quay is situated at the Mill Dam, and has a riv. frontage of 119 ft. Since the glass and chemical trades died out shipbuilding and ship-repairing, engineering, and coal-mining have flourished. The industries of S. S. are most extensive and varied, mainly connected with metal manufs., but also ranging from asbestos to saucers and jams. S. S. is also notable as a holiday resort. The cliff scenery from Trow Rocks to Marsden is unequalled on the N.E. coast for beauty and interest. The land forming this green belt E. of the coast road was bought by the corporation for public recreation.

Because the charter of incorporation of S. S. dates back only to 1850 it is often thought that the tn. is entirely a product of the age of the steamship, but, in fact, S. S. traces its hist. back to about A.D. 80, when the Romans estab. an important station to guard the mouth of the Tyne beyond the end of Hadrian's Wall. Some bare remains of the Rom. camp are still preserved in the Rom. park at the N. end of Baring Street. Recent excavations have proved that the fort was used as an advanced base for the Rom. invasion of Scotland by Severus. *Cæsar Urbs*, or the 'town on the rock', is the earliest known name of S. S. S. S., anciently written *Scheles*, and later *South Sheles*, took its name from the primitive huts or *shields* erected by the villagers, who were fishermen. Subsequently, and for some centuries, the place was known for its salt works. In 1245 the prior and convent of Durham founded the great tn. of to-day. In the seventeenth century large and flourishing glassworks were carried on, principally by the Dagnia family at first, and later by the Cooksons, who opened chemical works in 1720. Then the

collieries began to dominate the economic position, and with that came a great extension of the shipping trade, especially for coasters. This, in turn, led to shipbuilding, and eventually to the estab. of engineering works, while at the same time S. S. became, as its natural position demanded, one of the busiest centres on the coast. In the Second World War the tn. received damage from air raids. S. S. returns one member to Parliament. Pop. 107,500. See H. A. Moss, *Industrial Tyneside: a Social Survey*, 1928.

Shifnal, mkt. tn. of Shropshire, England, 17 m. E.S.E. of Shrewsbury. It has an anct. church. There are iron foundries and blast furnaces. Pop. 8800.

Shigatse, or **Digarski**, city of Tibet, second in importance to Lhasa, the cap. It is about 5 m. from the Brahmaputra, and stands 11,800 ft. above sea level. The Tashilunpo monastery, the residence of one of the great high priests of Tibet, is situated to the S.W. of the city, and between it and the city is the *thom* or bazaar, where all the business of the place is daily transacted. The soil is rich and produces grain. Pop. 12,000.

Shiites, or **Shias**, div. of the Muslims which maintains that Ali, Mohammed's son-in-law, the husband of his daughter Fatima, was the first legitimate successor of the prophet, and thus that only his descendants are the rightful caliphs. In direct opposition to the S. are the Sunnites, who claim to be the orthodox sect, and recognise the first three caliphs as legitimate successors of Mohammed, and accept six books of the Sunna, which purport to contain the verbal utterances of Mohammed, in contradistinction to the Koran, the written revelation. See also MOHAMMEDANISM. See P. M. Sykes, *The Glory of the Shia World*, 1910, and D. M. Donaldson, *The Shi'ite Religion: a History of Islam in Persia and Irak*, 1933.

Shikari (**Shekarry**), term used by Anglo-Indians for hunters or sportsmen engaged in the pursuit of large game, e.g. tiger-shooting. It is used in two senses: (1) the native expert who marks the game for the sportsman; and (2) the European sportsman.

Shikarpur, tn. of Pakistan, in the Sukkur dist. of Sind. It commands the trade route through the Bolan Pass, and manufs. carpets, cotton cloth, and pottery. Pop. 70,000.

Shikoku, is. of Japan, S.W. of Honshu, with an area of 7218 sq. m. Includes 187 is. Pop. over 3,000,000.

Shildon, tn. 3 m. S.E. of Bishop Auckland, Durham, England, with silk, lam, and clothing factories, and coal-mines, quarries, and iron foundries. Pop. 14,700.

Shilka, riv. of E. Siberia, in the Buryat Mongolian A.S.S.R., a trib. of the R. Amur. It has a length of 760 m.

Shillelagh, tn. of Ireland, in co. Wicklow 16 m. from Arklow. The wood of S. gives its name to the Irish bludgeon. Pop. 300.

Shilleto, Richard (1809-76), Eng. classical scholar, educated at Shrewsbury and at Trinity College, Cambridge. For over thirty years he was the leading Cambridge

coach, and he also lectured. In 1887 he was elected fellow of Peterhouse. He ed. Domosthenes' *De Falsa Legatione* (1844), and Thucydides, book i. and part of book ii. (1872-80); and annotated some of the Gk. philosophers, including Aristotle. He also pub. *Thucydides or Grote* (1851), and contributed to *Notes and Queries* under the anagram 'Charles Thirliold.' He was noted also for his skits in Lat., Gk., and Eng.

Shillibeer, George (1797-1866), Eng. coach-builder. *b.* in London. Having studied his trade in Long Acre, he set up business in Paris, where he was commissioned to build two omnibuses, and in 1829 introduced that type of vehicle into London. *See also* OMNIBUS.

Shilling, Eng. silver or cupro-nickel coin, equal in value to one-twentieth of a pound or to twelve pence. It was first struck in 1504, and in Charles II.'s reign first appeared with milled edges, while it was not until the time of George IV. that Hon S., similar to those coined in Henry VII.'s reign, were struck. The standard weight of a silver S. is 87.27 grammes, 1 lb. troy of silver being used for sixty-six Ss.

Shillong, cap. of Assam, India, 63 m. S. of Gauhati, on the Brahmaputra R. It has an average rainfall of 81 in., and is 4900 ft. above sea level. S. became cap. of Assam under Brit. rule in 1874; after the creation of the prov. of Bengal and Assam it was used only as the summer cap. When Assam became a separate prov. again in 1912 S. recovered full cap. rank. During the Second World War it was a communication centre, and when India gained dominion status in 1947 its importance increased. It now holds the position of cap. of a frontier prov. bordered by Pakistan, Burma, Tibet, and China. The whole tn. was rebuilt after a severe earthquake. In 1897 and contains many fine modern buildings. Pop. 50,000.

Shilluk, tribe of the Anglo-Egyptian Sudan, whose country forms a narrow fringe on the W. bank of the Nile, from Kaka in the N. to within 30 m. of Lake No in the S. From Kodok to Taufikia the Shilluk also occupy the E. bank, and their vils. extend 35 m. up the Sobat R., mostly on the N. bank. The Shilluk country is the flat grassland on both sides of the Nile; cattle are their wealth and prin. care, and although much millet is grown, not enough is harvested to meet the needs of a relatively dense pop. The pop. in 1903 was 40,000. There are three clearly defined elements in the religion of the S.: the recognition and worship of a god, Juok (formless and invisible and, like the air, everywhere at once, and the sender of rain); the cult of Nyakang, and the dead kings of the S.; and the cult of ancestor spirits other than that of Nyakang. Besides these prominent features of their religion the S. believe in anthropomorphic but non-human beings dwelling in riv. and bush, the most important being the riv.-people, with whom are associated herds of supernatural riv.-cattle. *See* W. Hofmayr, *Die Shilluk: Geschichte, Religion und Leben eines Niloten-Stammes*, 1925.

Shiloh, tn. of Ephraim in Palestine, identified with the modern Sellun. It is on the road from Bethel to Shechem, 19 m. from Jerusalem. The sanctuary of the Ark of the Covenant was in S.

Shimizu, seaport on the S. coast of Honshu, Japan, with an export trade in cement, fish products, and tea. Pop. 61,100.

Shimoga, dist. of India, in the prov. of Mysore, with an area of 1058 sq. m., and a pop. of 551,000. About one-fifth of the land is tilled for rice and *ragi*. India's only plant for wood distillation is at the iron and steel works at Bhadravah. The cap., S., has a pop. of 28,000.

Shimonoseki, fortified seaport of Honshu, Japan, on the Inland Sea, was bombarded in 1861 by the fleets of Britain, America, France, and Holland, when the fortifications were destroyed and the tn. partly levelled. It was opened to foreign commerce in 1890, and is an important commercial tn. with a good harbour. By the treaty signed in S. and bearing its name, between China and Japan in 1895, Japan gained possession of Formosa and a free entry into Korea. S. was heavily damaged by Amer. bombers in 1945. Pop. 92,000.

Shingles, popular name for *Herpes zoster*, an inflammatory skin affection, characterised by the formation of vesicles along the course of a cutaneous nerve. The cause is obscure. People in general ill health are likely to be attacked, and there may be a connection between S. and chicken-pox. The skin eruption usually disappears in a few weeks, but the accompanying pain may persist for months, especially in older people.

Shintoism, *see* JAPAN, Religion.

Shinwell, Emmanuel (b. 1881), Brit. Labour politician, *b.* in London; his early years were passed in Glasgow. He was responsible for the national organisation of the Marine Workers' Union. Elected Labour member of Parliament for Linlithgow (1922-24), and again from 1928 to 1931. He was financial secretary of the War Office, 1929-30, and parl. secretary to the dept. of mines in 1924 and in 1930-31. In 1935 he won the constituency of Seaham Harbour from Ramsay MacDonald. As minister of fuel and power (1945-47) he carried through the nationalisation of the coal-mines. He was appointed war minister in 1947, and minister of defence in 1950. S. is a member of the National Executive of the Labour party. *Publs.*: *The Britain I Want* (1943) and *When the Men come Home* (1944).

Shiogamo-no-Matsushima, *see* MATSU-SHIMA.

Shipbuilding, *see* SHIPS AND SHIP-BUILDING.

Shipka Pass, situated 47 m. N.E. of Plovdiv (Philippopolis), Bulgaria. It is a pass over the Balkans, and was held by the Russians against Sultan Pasha in 1877.

Shipley, woollen manufacturing and engineering tn. on the R. Aire, 3 m. from Bradford in the W. Riding of Yorkshire. Pop. 32,000.

Ship-money, tax imposed by the king upon seaports and trading towns which compelled them to provide and furnish warships, or to pay money for that purpose. It was first levied about 1007 to form a navy to oppose the Danes, but appears to have fallen into disuse. It was, however, forbidden by the Petition of Right in 1628, but, notwithstanding, it was levied by Charles I. (1634-38) without the consent of Parliament. It was one of the indirect causes of the great rebellion, meeting with great opposition, especially from Hampden. When Hampden was tried for non-payment before the court of the Exchequer in 1637, seven out of twelve judges declared that Charles was entitled to levy the tax. It was abolished by statute in 1641. See H. Chester, *Ship-money Papers*, 1637-39.

Shipping, see MERCANTILE MARINE; MERCHANT SHIPPING ACTS.

Shipping, Control of, see CONTRABAND; ECONOMIC WARFARE. MINISTRY OF; CONTROL, ALLIED; NAVIGANT; SHIPPING, MINISTRY OF; TRANSPORT, MINISTRY OF.

Shipping Forecasts, see WEATHER FORECAST.

Shipping Losses in the World Wars. In Aug. 1914 the United Kingdom possessed 18,892,000 tons of steam vessels, and about 365,000 tons of sailing ships and non-propelled craft; nine other nations, the Ger. Empire (5,459,000 tons), the U.S.A. (5,323,000), Norway (2,305,000), France (2,319,000), Japan (1,708,000), Italy (1,668,000), Holland (1,496,000), Sweden (1,118,000) and Russia (1,054,000) possessed (as far as could be ascertained) more than 1,000,000 tons. During the First World War the United Kingdom's losses in shipping totalled 7,800,000 tons, a very large part of which was due to submarine warfare; yet the surprising fact emerges that although nearly one-half of the mercantile marine was lost during the struggle, the gross tonnage in Dec. 1918 was only 2,500,000 below the 1914 figures. Captured enemy ships and purchases from other nations accounted for part of the new tonnage added, but even when this is allowed for, the output of the Brit. shipbuilding yards was remarkable in view of the shortage of labour and war conditions generally. After March 1917 the submarine menace to shipping reached its most serious phase. The Admiralty statement for that year showed the total loss of Brit., allied, and neutral shipping to be 2,236,000 tons during the quarter ending June 30, and 1,500,000 and 1,272,000 respectively during the two succeeding quarters. During 1918 the output of Brit. shipbuilding yards increased at a steady rate and the losses decreased. The net loss of shipping, which in Jan. was 160,000 tons, fell to 31,000 tons during June, the month which practically ended the worst peril on the sea. At the close of the First World War it was estimated that there was a shortage of 5,000,000 tons in the world's shipping, and for some time great difficulty was experienced by shippers. This scarcity led to much speculation, and shipbuilding received an impetus that in the course of three or four years led to over-production.

From the start of the Second World War in 1939 to the end of the war with Germany in 1945 4280 allied merchant ships, totalling 19,720,000 gross tons, were lost by enemy action. Of these 2426 belonged to the Brit. Empire, totalling 11,331,933 tons. Neutral countries lost 490 ships (1,420,000 tons). U-boats accounted for 2770 ships, of which 1332 were Brit.; 440 Amer., 670 other allied, and 300 neutral. By mines 520 ships were lost, including 296 Brit. and 15 Amer. The losses to surface raiders were 300 (209 Brit. and 13 Amer.). Aircraft sank 750 (383 Brit. and 58 Amer.). Some 100 vessels, including 206 Brit. and 12 Amer., went down through other or unknown causes. Altogether the U.S.A. lost 538 ships (3,310,000 tons), and the other allies, except the Brit. Empire, 1172 (5,030,000 tons). In addition through marine risks the Brit. Empire lost 610 ships of 1,120,000 gross tons. The graph of shipping losses slanted sharply upwards in the years 1910-41, and after only two and a half years of war Britain had lost nearly one-third of the merchant fleet that flew the red ensign on Sept. 3, 1939. In March 1940 less than 100,000 tons gross of Brit., allied, and neutral ships had been sunk. In June the figure had risen to more than 500,000 tons. During the next nine months the losses averaged nearly 400,000 tons a month compared with a previous average of 182,000 tons. In the following spring of 1941 the Gers. intensified their campaign. For three months the shipping losses averaged 534,000 tons. But with stronger naval and air escorts merchant shipping losses fell to 180,000 tons a month. With the entry of Japan in the war shipping losses in the early part of 1942 were again heavy, too heavy for the rapid assembly and concentration of striking power which the military situation demanded. By June 30, 1918, however, Britain had recovered her pre-war shipping levels, and tonnage destroyed during the Second World War had been replaced. Great Britain and N. Ireland possessed 18,112,101 tons of shipping: this was 22.3 per cent of the world tonnage (81,074,188 tons). Britain therefore possessed the second highest total, the U.S.A. leading with 29,601,987 tons (36.5 per cent). Britain's tonnage was a slight increase over 1939; but the U.S.A. increased her tonnage in the same period by a much higher proportion. In 1948 29.5 per cent of tonnage in Great Britain and N. Ireland was less than five years old. See further *UNDERSHIPS AND SHIPBUILDING, Shipbuilding Methods in the World Wars*.

Shipping, Ministry of, formed in 1916, during the First World War, for the purpose of controlling allied shipping resources so as to secure the most economic use of tonnage. The tonnage shortage, by reason of the Ger. submarine campaign and the demands made on shipping for transport of troops and supplies, became acute towards the close of Asquith's premiership, and the Advisory Committee of the Transport Dept. of the Admiralty presented to the Premier and the secretary of the Admiralty a memorandum urging that the Shipping Control Committee or

some other central authority should be entrusted with full powers to survey the tonnage situation as a whole and to transfer any vessel or any service to such other employment as might seem expedient. When Lloyd George took office he at once announced the appointment of Sir Joseph (afterwards Lord) Maclay as shipping controller with ministerial rank. Executive duties were carried out by a director of transport and shipping. The ministry was wound up after the cessation of hostilities. In the Second World War merchant ship construction came within the prov. of the M. of S., but, in the interests of co-ordination, was later transferred to the Admiralty, the dept. responsible for the building of warships. The types and design of the merchant ships were, however, decided in co-operation with the M. of S., later merged in the Ministry of War Transport. See C. E. Fayle, *Seaborne Trade (History of the Great War in Official Documents, 1923, vol. ii.)*.

Shipping, Registration of, see **MERCHANT SHIPPING ACTS; LOAD LINE.**

Shipping Routes. The S. R. of the Rom. Empire were confined to the Mediterranean, linking Rome with Gades, Tarraco, Massilia, Carthage, and Alexandria. In the Middle Ages the centre of the Mediterranean S. R. shifted from Rome to Venice, while in the N. seas the S. R. radiated from the Hanse tns. Columbus opened the route to America in 1492, while the S. R. to the Far E. were for a long time in the hands of the Portuguese, following Vasco da Gama's voyage in 1498. Modern S. R. are Atlantic; W.-bound ships between Feb. and Aug. steer from Fastnet in the great circle course, but nothing S., to cross the meridian of 47° W. in lat. 41° 30' N., thence to Boston light-vessel or to a position S. of Nantucket light-vessel. Between Sept. and Jan. ships cross the meridian of 50° W. in lat. 44° N. East-bound ships steer to a position nothing N. of the great circle to Fastnet, crossing the meridian of 47° W. in lat. 10° 30' N. (between Feb. and Aug.) or of 50° W. in lat. 43° N. (between Sept. and Jan.). The route to Canada is from position 10 m. S. of the Bishop's Rock in great circle course, crossing the meridian of 47° W. in lat. 42° N., thence to Halifax or other ports. There are other routes, such as the Belle Isle route. There are two S. R. to and from Australia, viz. via the Suez Canal and via the Cape. Outward bound via the Cape ships depart from Tuckar, and the set course passes 25 m. W. of Scilly Isles and 30 m. W. of Cape Verano, thence to Tenerife. The equator is crossed in long. 10° W. A prescribed course is then steered across the S. Atlantic Ocean to Green Point, Table Bay. The S. R. to New Zealand are the same as to Australia, with or without transhipping at Sydney or Hobart. A third route is via the Azores and Panama Canal, and the return route from New Zealand is usually either via the Panama Canal or round Cape Horn. The Suez Canal (1869) is a focal point of the S. R. to the Far E., and the Panama Canal (1915) shortens nearly all S. R. between the Atlantic and Pacific Oceans. In time

of war considerable variations in S. R. are made by the Admiralty.

Ships and Shipbuilding. *History of Sailing Ships.*—Shipbuilding is among the most anct. of arts. As in the case of bridge building, the idea was probably suggested by the floating of a fallen tree bearing some animal upon the water. So, by way of a raft or catamaran, and certainly by means of a hollowed tree-trunk, canoes (q.v.) and coracles (q.v.) were naturally evolved. Many dug-out canoes of prehistoric date have been found in Britain in marshes or old riv. courses; they were probably hollowed out by wedges and by fire. The building of ships also must have commenced at a very early date. Paintings and sculptures of anct. Egypt show that the Egyptians built ships apparently constructed of sawn planks, and propelled by means of oars and sails. The Phenicians were undoubtedly a wonderfully enterprising seafaring race. According to Herodotus they sent out an expedition which, starting from the Red Sea, passed by way of Ophir round the Cape of Good Hope, and entering the Mediterranean again through the Pillars of Hercules, or Strait of Gibraltar, arrived in Egypt after three years. They also traded with India, and with Britain, even going as far N. as the mouth of the Rhine. Either the Phenicians or the Egyptians invented the bireme and trireme war-galley, thus increasing the vessel's speed (oar power) without having to increase its length. The Chinese, too, at the same time were known as seafarers.

The Gks. were great navigators and fought many naval battles with the Persians and the Phenicians. The greatest development, however, occurred when the rivalry between the Carthaginians and Romans became fierce. Then the great fighting galleys were evolved. The Gks. went beyond the trireme and built vessels of four, five, and even sixteen banks of oars, although the arrangement of the sixteen-tiered galley has never been solved. The Attic trireme carried a crew of 200 to 225 men, 170 being rowers, the rest being seamen and marines. The trireme, or three-banked galley, was generally open amidships, where the rowers sat, with decks fore and aft for the soldiers. Sometimes the fighting deck extended the whole length of the ship, and this appears to have been always the case with vessels greater than the triremes. These galleys were built higher aft than forward, and generally had a beak or ram at the prow for cutting into opposing ships. They usually carried one mast amidships, bearing one large square sail. The Romans appear to have had three classes of ships: (1) those for war, (2) ships of burthen, and (3) ships built for great speed, to carry passengers and dispatches. They were built of pine or cedar, with the bows made of oak clamped with brass. Copper was introduced in the time of Nero, because of its non-corrosion, and the caulking in those days seems to have been flax. It will be remembered that in 1928 the It. drained Lake Nemi to recover the house-boats of Caligula.

With the decline of Rome the Nations took up the art. The Vikings used ships of various sizes, the smaller for inland waterways. Both oars and sails were employed. The clinker built ship in which the Sutton Hoo treasure was built was found from its 'ghost' in the sand to be about 80 ft long and 14 ft in maximum beam. A famous Viking ship found in a Schleswig peat bog at Nydam in 1863 is preserved at Kiel. Both these ships were steered by stern paddles. Another well known Viking ship was excavated in 1880 from a tumulus at Gokstad in the Oslo fjord. It is exhibited at Bygdøy; it is 77 ft long, 17 ft in beam and 5 ft 9 in deep. The keel is 57 ft long and 14 in deep. It had one pine mast 40 ft high and sixteen oars a side, each from 25 to 40 ft long, and projecting through ports in the sides. Along the bulwarks was a row of shields to protect the rowers. From this time until the seventeenth century the size of vessels did not increase much. Alfred the Great founded the navy with galleys which had from forty to sixty oars on each side. They were most powerful in checking the Danes, being twice as long, quicker, easier to manage and less rolling than Dan ships. On the other hand, they set back the evolution of sailing ships and long voyages became infrequent until Richard Coeur de Lion in A.D. 1190 sent a fleet of nine very large ships, 150 smaller ones, and only thirty-eight galleys to the Holy Land. In the Mediterranean the ships had been developing in size and the use of sails was beginning to supersede oars for it is on record that Richard's fleet was increased

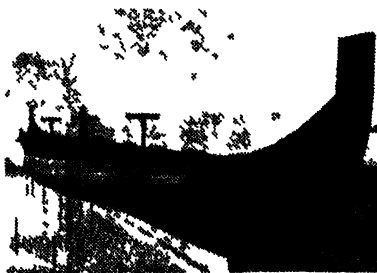
by a third. This of course, rendered coasting more or less unnecessary and from then on the introduction of sails and other appliances became general and rapid. England lagged behind at first in the new era but Henry V, in the beginning of the fifteenth century, had several large vessels built which equalled and surpassed anything then existing. One of these was 160 ft long and 46 ft in beam.

Henry VII built what was really the first ship in the British Navy. This was the *Henry Grace à Dieu*, 138 ft long, 38 ft in beam of 1000 tons burthen. She carried 120 guns, the largest of which were four sixty pounders, and cost £8700 to build. Henry VIII however organised the navy as a distinct service by setting up the Admiralty, Trinity House and dockyards at Deptford, Woolwich and Portsmouth. Great progress was made in shipbuilding throughout Tudor times and among technical improvements were striking improvements in the use of chain pumps, introduction of studding topgallant sprit and top sails, weighing anchor by capstan and long cable.

The ships of the sixteenth century were built very short and beamy with high ends, especially at the stern. This high stern undoubtedly completed the disaster to the *Sp. Armada*, by rendering the ships unmanoeuvrable in the storm which overtook them. The seventeenth century is notable because at that time lived Phineas Pett who not only introduced the frigate (*galley*) into the British Navy but also designed and caused to be constructed (in the face of heavy opposition) the *Sovereign of the Seas*, which was the first three-decker. She cost £100,000 to build and was 164 tons burthen, being 168 ft long, 45 ft in beam and carrying 100 guns. This century too saw the foundation of the Shipwrights Company (1612) its first president being Phineas Pett.

The science of naval architecture did not develop quickly in Britain. Ship carpentry was very skilled and Pett and his son and Sir A. Deane did much to raise the level of the science. But France, Spain, Sweden and Denmark at the time possessed much finer and bigger ships than Britain, though in the latter part of the eighteenth century, British ships became supreme. In the beginning of the nineteenth century a pioneer arose in Robert F. Phipps who made a departure completely from the stereotyped methods of construction. He introduced diagonal masts and riggers, which in conjunction with the old transverse framing prevented 'hogging' or the dropping of the centre of a ship relatively to the middle. Other improvements, such as the introduction of filling pieces which occupied the space between the frames up to the bilges, so strengthening the ship against hogging, and at the same time forming a safeguard in case of accident to the ship's bottom, lessening of the fore and aft beams, and the abolition of the high, square sterns are all directly attributable to Phipps's regime as surveyor of the navy.

By 1820 England owing to her commercial possessions had become the chief



Oslo Univ. Museum. Viking Ship Hall.
B. 15

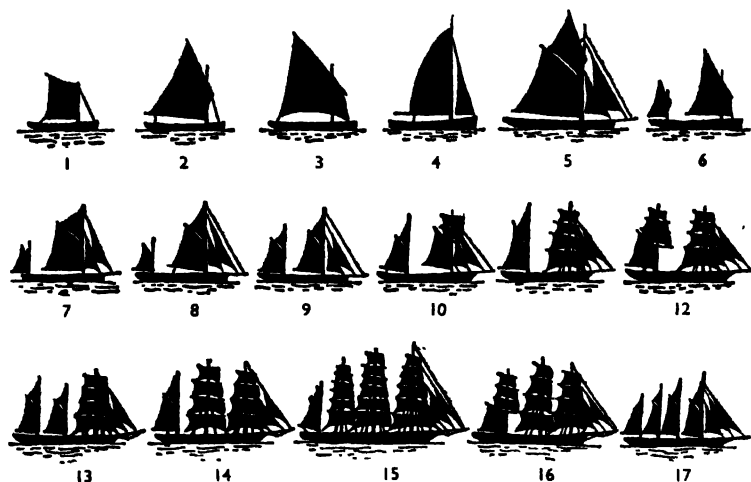
THE GOKSTAD SHIP. NINTH CENTURY.
Keel red in 1936

by over 100 large sailing ships at Marseilles and Sicily, while he captured a Saracenic ship which could carry 1,000 men besides a large cargo of stores. It was during this time that the steering oar on the ship's side gradually disappeared and a rudder hanging on the stern became usual.

With the opening of the fourteenth century, however, naval architecture (*galley*) or the theory and shipbuilding itself began to evolve rapidly. This was due to the fact that just at that time the mariner's compass was invented by Flavio

country as regards sailing ships, and of Eng. shipping concerns the E. India company occupied the foremost position. Iron gradually began to enter more and more into the construction of ships, and by 1840 wood had practically been superseded in shipbuilding, except in America and Canada, where large ships were still sometimes built of wood. The fastest-sailing ships, however, were constructed of wooden planking on iron frames. Leppings was succeeded by Sir Wm. Symonds (surveyor of the navy, 1832-87), who brought

The celebrated sailing ship, the *Cutty Sark*, built in 1868 of wood and iron construction, was employed in the wool trade, and fast vessels were also required in the emigrant traffic to Australia. Here Amer. competition was especially keen. Amer. ships varied from 2000 to 2500 tons, and one of them, the *Lightning*, completed 436 m. in a day while crossing the Atlantic. This meant that she was driven at the average speed of 18½ knots for a day and a night, a speed which steamships did not reach for many years. By the end of the



TYPES OF SAILING SHIPS

- | | | |
|----------------------------------|----------------------|--------------------------|
| 1. Boat with sprit sail | 7. Yawl | 13. Barquentine |
| 2. Boat rigged with standing lug | 8. Ketch | 14. Barque |
| 3. Boat rigged with dipping lug | 9. Schooner | 15. Four-masted barque |
| 4. Boat with Bermuda rig | 10. Topsail schooner | 16. Three-masted ship |
| 5. Cutter | 11. Brigantine | 17. Four-masted schooner |
| 6. Lugger | 12. Brig | |

Eng. sailing men-of-war to their finest pitch. He improved their seaworthiness and speed, evolved the elliptical stern, and invented the system whereby spars were interchangeable not only on one ship, but between different ships and different classes of ships. By this time differences between merchant vessels and men-of-war had become more apparent than in earlier periods, and the rivalry between Amer. and Brit. owners for the possession of the Chinese and Indian tea trade led to the improvement of the merchant vessel. The first real clipper, the *Ann McKim*, was built in Baltimore in 1832, and Britain soon adopted this fine type of fast-sailing ship. *Sir Launcelet*, one of the finest of the tea clippers, as these fast vessels were called, marks the highest development of the sailing ship. It was built in 1865, and was able to complete the passage from Foochow to the Lizard in eighty-five days.

nineteenth century ships became larger, and a four-masted barque-rig became the standard type of sailing vessel. These ships were sometimes 400 ft. in length, and capable of carrying a cargo of 5000 tons.

Types of Sailing Ships. Sailing ships are either square-rigged or fore-and-aft rigged, or a compromise between these types. The diagram of a full-rigged ship (page 354) shows a square-rigged. The one-masted sprit-rig with a triangular or quadrilateral foresail is probably the oldest type of sailing ship still in use in N. Europe. A miniature of a ship of this type is seen in a Flem. MS. of A.D. 1420. The cutter, or sloop a gaff-sailed one-masted, probably developed from the Dutch yachts of the eighteenth century. Two-masters are either gaff- or sprit-sailed, having a difference in the size of the two masts. The Thames barge is an example of a sprit-sailed vessel, having a

big mainsail and small mizen, while the gaff-sailed two-master may have two sails of equal size, or a large mainsail and small mizen as in a yawl or ketch, or a big mainsail and a somewhat smaller mizen. The last Amer. schooners were particularly fine vessels, having four to six masts. The day of the sailing ship for the purposes of trade is past. This was brought about by the introduction of the steamship, although in the beginning the steam-tug actually furthered the development of the sailing ship as it permitted the sailing capacities of ships on the high seas to be considered without regard to their easy management in confined waters.

History of Steamships.—The idea of propelling ships independently of the wind obviously first led to the use of manual labour in pulling of oars. It might be assumed from old sculptures that the Egyptians used oxen to turn wheels which propelled the ship. Whether this be so or not, it is certain that minds have been engaged from very early times in endeavouring to conceive some form of mechanical propulsion. The discovery of the use of steam as a means of propulsion of land vehicles soon led naturally to attempts to utilise it on behalf of floating vessels. Many attempts, however, had to be made before success was won, and steamships did not take their place as commercial factors as rapidly as locomotives did. It is claimed that the first attempt at such propulsion was made by Blasco de Garay at Barcelona in 1583. Denis Papin applied his engine (originally proposed as a pump) to a model boat, the *Fulda*, at Cassel in 1707; but the local boatmen destroyed the ship at night, and he himself narrowly escaped with his life. In 1736 one Jonathan Hulls took out a patent in England for a steam-engine which was intended to be used in a tugboat, but it never materialised. In 1770 an Amer., Wm. Henry, having seen James Watt's engine, constructed model boats at Lancaster, Pennsylvania, and although these were unsuccessful, yet among those who watched and gathered knowledge were John Fitch and Robert Fulton, who were among the first successful steamship designers. At last, in 1786, James Ramsay constructed one which travelled at 4 m.p.h. up-stream. In 1790 Fitch constructed one which attained a speed of 7 m.p.h. So the efforts went on, it being even claimed that John Stevens, an Amer., actually ran a twin-screw steamer at 6 m.p.h. on the R. Hudson in 1804. In any case he did build a steamer in 1808, which ran from New York to Philadelphia. In England Patrick Miller, a retired banker, together with his son's tutor, James Taylor, and Wm. Symington, an expert mechanic, were working in order to apply the steam-engine to ships, after the first-named had spent years in experimenting with hand-driven mechanism. In 1788 they produced a boat; it was not, however, a commercial success. In 1802 the *Charlotte Dundas* was launched on the Forth and Clyde Canal, having been constructed by Symington. She towed two barges, carrying seventy tons each. The paddle wheel was at the stern. The

effort was not persevered with because the wash, it was feared, would seriously injure the banks. Fulton had seen this vessel, and in 1807 he built a steamer, the *Clermont*, which ran from New York to Albany (150 m.) in 32 hrs. and back in 30. This steamer was kept in service, and two others added, and in 1812 was launched the *Comet*, first built in 1804, which was built in England by Bell, Napier, and Robertson. This ship had a paddle on each side, which drove her along at 5 m.p.h. She also was a commercial success, and two others were then built for service from Glasgow. From this time on the steamship-building industry rapidly developed on the banks of the Clyde. In 1814 the *Morjory* was built, and was the first steamer to sail on the Thames. So the evolution continued until in 1818 a steamer was built by Napier for cross-channel purposes, sailing from Greenock to Belfast. The first steamship to cross the Atlantic was the Dutch vessel *Curaçao*, later renamed *Calpe*. Built at Dover in 1826, she was a wooden paddle of 438 tons register. Purchased by the Dutch as a man-of-war, but employed on the mail service to the W. Indies, she left Rotterdam on her first passage in April 1827, and took a month to cross. The next transatlantic steamer, the *Royal William*, was built in Canada, one of her owners being Samuel Cunard. Designed to sail between Quebec and Halifax she crossed from Quebec to London in seventeen days in 1833. Britain's entry into the transatlantic efforts began with the *Great Western*, a paddle steamer 236 ft. long, 35 ft. in beam, and with a hold 23 ft. deep, built for the Great Western Railway Company. Three days before her departure from Bristol on April 8, 1838, the *Sirius*, 170 ft. long, had left Cork, and both were bound for New York. The *Sirius* arrived in the morning and the *Great Western* in the afternoon of April 23, the former having taken eighteen and the latter fifteen days to cross. The first great iron steamship built was the *Rainbow*, launched in 1838, which traded from London to Ramsgate and Antwerp. Early steamers still depended to some extent on sails for auxiliary power, and they were used when possible.

It was only with great difficulty that the prejudice against the use of iron was overcome. Its advantages are now obvious, for it possesses greater strength with lightness. Wood has to be nearly as heavy as its cargo to have sufficient strength, while iron, and steel even more so, can carry twice its own weight. On the other hand, metal bottoms are apt to foul and corrode, so for a while composite vessels were built, i.e. wood planking on iron frames, the planks being caulked and copper sheathed. The clippers referred to in the paragraphs on sailing ships were of this type. To-day yachts are built in this manner.

The next era in shipbuilding began in 1839, when Pet. Smith designed the *Archimedes*, which was the first steamer propelled by a screw. Brunel, the designer of the *Great Western*, fitted the *Great Britain* with a screw-propeller, and in 1845 she crossed from Liverpool to New

York in fourteen days and a half. In 1862 the Cunard Company obtained permission to fit the mail steamers with propellers, and from then on the paddle wheel has been relegated to comparatively smooth water. The reasons for this are simple, it being obvious that a propeller will suffer less from the rolling of a ship than will paddles, and even with pitching motions it is less affected than paddles if well immersed. Again, it acts on a relatively larger volume of water in any given time, and is less affected by the changes in the draught of a ship, which must inevitably happen with cargo steamers. This, together with the opening of the Suez Canal in 1870, and the simultaneous introduction of the renowned compound engine, raised steamships to a superiority over sailing ships, with the result that they have become larger and greater in number as sailing ships have decreased in importance. The following table shows the various categories of ships, according to fuel employed, as percentages of total gross tonnage in 1938, 1939, and 1948.

Year	Percentage of Total Gross Tonnage			
	Sailing Vessels	Motor Ships	Oil-burning Steamers	Coal-burning Steamers
1938	1.44	22.45	29.57	46.54
1939	1.34	21.36	29.63	47.67
1948	0.97	21.20	55.53	22.30
1949	0.93	23.22	54.96	20.89

The evolution in marine propulsion has consisted rather in the improvement of engines than in any variation in the method of propulsion. Thus in 1902 the turbine engine was employed on passenger steamers on the Clyde, and in 1905 was applied to the transatlantic service (see STEAM ENGINES). The next step was the provision of internal combustion engines (i.e.). (For the development of internal combustion engines and electrical engines, in relation to ship propulsion, see MOTOR BOATS; MOTOR SHIPS.) In the period following 1914 there was a rapid advance in the motor ship, and its development is shown in the following table:

Year	No.	Gross Tons
1914	297	234,287
1919	912	752,606
1931	4,080	9,131,433
1934	4,941	10,604,326
1937	6,763	13,748,713
1938	6,912	15,232,953
1939	7,551	16,918,687
1948	9,646	17,190,850
1949	10,757	19,351,719

Before leaving the hist. of steamships, however, one or two comparisons may well be made to show the enormous strides which have been made since steam has

been introduced for marine propulsion. Thus the h.p. of Bell's *Comet* was about three; that of the *Aquitania* (1914) 60,000; while the *Imperator* (renamed *Berengaria*) had a h.p. of 72,000. The h.p. of the *Queen Elizabeth* is 158,000. The *Comet*, with her improved engines, travelled at 6 m.p.h.; the *Queen Elizabeth* can achieve more than 30 knots; while destroyers and motor-boats have achieved speeds up to 40 knots. The *Comet* was 40 ft. long, and 104 ft. in beam; the *Queen Elizabeth* is 1030 ft. long, 118 ft. in beam, and 68 ft. deep. The *Normandie* (France), which beat the Atlantic record in June 1935, was a quadruple screw vessel, 962 ft. long, 117.7 ft. broad, 91.8 ft. deep, with gross tonnage of 80,000, or twice that of the *Mauretania*. The *Queen Mary* (q.v.) is an 81,235-ton Cunard vessel, 975 ft. long, which broke the Atlantic record in 1936, only to lose it to the *Normandie* again the following year. The latter was electrically driven by propulsion motors powered by four compound turbo-generators, each developing 33,400 kilowatts. The *Queen Mary* is

driven by sixteen main steam-turbines of the impulse-reaction type.

The great speeds which have been obtained to-day require an enormous consumption of fuel. This can well be understood by noting that it requires over 10,000 times as great a h.p. to drive the *Queen Elizabeth* but six times as fast as the *Comet*. Naturally the former boat is of a much greater displacement than the *Comet*, but the 'lines' have been improved. To show it more clearly, however, it may be remarked that to drive an ordinary tramp steamer one knot faster than any given speed it requires roughly twice as much h.p.

After about 1914 there grew up a large fleet of oil tankers to cope with extensions in the oil industry, caused *inter alia* by the greater amount of oil fuel used in steamships. The largest oil-tanker-owning countries in 1949 were Great Britain and N. Ireland (3,690,000 tons), U.S.A. (4,736,000 tons), Norway (2,181,000 tons), and Panama (1,525,000 tons).

Shipbuilding.—The details of shipbuilding are naturally most intricate, and for special application the reader is referred to text-books on the subject mentioned at the end of this article. A ship, and particularly a modern luxury liner, is a monument to the ingenuity and skill of man. It is a floating township carrying everything civilisation demands for personal comfort, in addition to propelling machinery capable of developing thousands

of h.p. and which can drive the vessel at speeds often exceeding 30 m.p.h. Warships are even more complex structures, owing to the nature of the work required of them; they must be fast, light, and so arranged as to offer as little obstruction to the full use of the armament as possible. The normal procedure is for the shipowner who is ordering a new vessel to give to the naval architect his requirements. These usually include length, breadth, draught, displacement, speed, type of main engines (steam turbines, reciprocating, or internal combustion engines), number of passengers to be catered for, type and weight of cargo to be carried and the classification society (Lloyd's, Bureau Veritas, etc.). If any, in which the ship is to be classed. This information enables the approximate shape of the hull to be determined, and this serves as a datum from which the design can be commenced, modifications being introduced when necessary. The approximate load water-line may now be estimated by making use of Archimedes' principle, which states that for a body to float the weight of the body must be equal to the weight of fluid displaced.

When a vessel of a new class is being constructed, there being no similar ship already built which may be used for comparison, it is customary to make a model of the hull in paraffin wax from the drawings of the lines, termed 'sheer drawings.' This model is then towed at various speeds in a specially constructed tank containing sea-water, and the resistances at the different speeds measured, the lines being modified until the model gives the required performance. There are formulae for translating the data obtained from the model into dimensions relating to the full-size ship; so as a result of these experiments, the sheer drawings are altered as may be required and calculations dealing with strength then proceed.

The ship is treated as a girder carrying an irregular load (due to weight of shell, machinery, fittings, etc.), and receiving a distributed support from the water. The dimensions, called scantlings, of its structural members are determined from two standard conditions of loading: (1) the ship being assumed to be at rest on the

tional areas. If the profile of the wave is traced and put on the profile of the ship, the area of each section up to the surface of the wave may at once be sealed off, and by integrating these areas throughout the length, the displacement and centre of buoyancy are found. As the total weight must be equal to the total buoyancy (i.e. total weight of sea water displaced) the displacement on the wave is finally fixed after sev. trials. Next, on a base of ship length, curves for buoyancy for both sagging and hogging conditions and curves of weight are plotted. The difference between the curves of buoyancy and weight, when plotted, gives the loading curve. By integrating the load curve the curve of shearing force is obtained, which when integrated gives the bending-moment curve. Bending stresses at any transverse section may now be calculated by the use of the ordinary fundamental beam

equation $\frac{M}{I} = \frac{f}{y}$; where M is the bending-moment, I the moment of inertia of the section about the neutral axis, f the intensity of stress at a point distant y from the neutral axis. The neutral axis is an imaginary line through the length of a beam where there is no stress—it always passes through the centre of gravity of the cross section.

In considering the strength longitudinally of a section, account must be taken only of such material as actually contributes to the strength through an appreciable length in the neighbourhood of the section, such as plating of the outer and inner bottom, keel, continuous longitudinals, deck plating, etc. Typical sections are drawn out from which the position of the neutral axis is fixed, then at any such transverse section, M , y , and f being known, it is a simple matter to determine I , and hence to fix the main scantlings. A check of weights and position of centre of gravity is now made, after which stresses under launching conditions are worked out. These stresses are occasionally very high, and call for special attention. Stability calculations next follow. The centre of gravity of the ship, with everything she has on board, must be



FIG. 1. ON CREST OF WAVE—'HOGGING'



FIG. 2. ACROSS TROUGH—'SAGGING'

crest of a wave equal in length to the length of the vessel and of depth $\frac{1}{3}$ of the length, and (2) the ship being taken at rest across the trough of a wave similar to that assumed in (1). In case (1) the vessel is said to be 'hogging' (Fig. 1) and in (2) to be 'sagging' (Fig. 2). These are extreme conditions, and the tendency is to cause the structure to bend in the manner suggested by the arrows. To get the displacement of the ship when on the wave it is convenient at various points, or stations, along the length to draw a curve of sec-

in the same straight vertical line as the centre of gravity of the displaced water, called the centre of buoyancy. When at sea the action of the wind and waves tend to move a ship from its upright position, but it must be so designed that the vessel returns to her correct position, when she is said to be stable. A ship is said to be in unstable equilibrium when, on being inclined from her position of rest, she tends to move away farther from that position; whilst if she stays inclined without trying to

right herself, she is said to be in neutral equilibrium.

With the main dimensions known, work now commences on details in connection with passenger accommodation, etc., within, as well as the various items of the superstructure. Work has already commenced on the construction of the machinery, whilst the shipyard drawing-office is busy preparing drawings and 'moulds' for the vessel herself. The first thing to consider is the slipway. This is of concrete on a good foundation, with rows of hardwood building blocks 4 to 6 ft. long by 1 ft. square, forming columns about 5 ft. high and about 4 ft. apart, except where special weights are to come, when they are much closer. The heights are adjusted by cast-iron wedges to suit the underside of the keel. The top of the slipway has a slope towards the water of 1 in 200.

In the mould loft, which is a very large room with a special floor of sufficient size to take the full depth of the ship, parts of the vessel are drawn out full size in chalk in order to 'fair' the lines, i.e. to make sure that the hull is true to shape within a fraction of an inch. From these drawings moulds are made in wood of the main structural members. There is also another large, specially prepared floor, called the scribe board, situated near to the shop where the bending and shaping of the frames are carried out. On this board are drawn out full-size half-cross-sections of the ship, and on it are shown plating, longitudinals, typical transverse frames, decks, beams, etc. The lines are cut into the blackened surface of the board, and from them the shipwrights and platers make wood moulds; thus the parts for the ship are made in wood first, from which the steel members are marked off and constructed in the shipbuilding shops.

All the larger ships are built on the longitudinal system in which the bending stresses are taken by fore and aft continuous members called longitudinals, stringers, and keelsons. These are braced by 'transverse frames,' which are built-up plate girders riveted into place between the longitudinals and stiffened by heavy angle sections. Smaller ships, down to a flying-boat hull, have the main strength in the transverse frame, which are continuous, whilst the longitudinal members are intercostal, i.e. fitted in between the main frames. Building on the slipway commences with the flat keels, two lines (strakes) of plating, one on top of the other, being laid in their correct position on the middle line blocks, followed by the vertical keel made of plating and fastened down the middle of the flat keels by heavy angles. Next, transverse frames are lowered into position by the gantry cranes over the slipway, then longitudinals, more frames, and so on. The outer and inner bottom plating is then riveted up and the plating continued until the shell is complete. Shoring and chains support the growing structure, great care being taken to check the form of the ship during building. Deck beams and bulkheads are put in as soon as possible to tie the frames. Special forgings or castings are placed in

position at the stem and stern when the framing is sufficiently advanced. The plates are joined together by lap or butt-strap joints, care being taken to stagger the joints. All the fastenings are by rivets; hydraulic riveting for units built up in the shop and pneumatic or hand riveting on the slipway. It is interesting to note that the stern is built about 3 in. higher than shown on the drawings, so that when the ship is afloat the settling of the stern, due to the heavy weight and reduced buoyancy at that part, gives her the true sheer line.

Launching.—The vessel is launched in its lightest possible condition after all the watertight parts of the structure have been tested and the outside plating given several coats of anti-corrosive and anti-fouling paint. When all is ready for the launch shores are knocked away and slide blocks are removed in sections, thus allowing the whole weight of the vessel to be taken on the groundways and slidingways. These launching ways are of pine, big, solid baulks, tank- or oak-faced on the top, about 4-ft. square section for the groundways and similar but smaller blocks for the slidingways. Between the latter and the ship's bottom are wedges. The bow and stern are supported in special cradles, called poppets. Between the groundways and slidingways some kind of lubricant is introduced, consisting generally of tallow, grease, and soft soap, whilst slipping is prevented by cleats and dogshores of African oak. The launch consists in knocking away the dogshores by means of a heavy weight, hydraulic jacks being placed at the top end of the slip to give the slidingways a start, if necessary. Once started, the ship moves quickly, but to slow it down the surface of the groundways has a slight camber. The dangerous moment is the instant when the stern is 'water-borne' and the fore poppets are taking the only load on the groundways. When the vessel is afloat, anchors and drags are run out to bring her to rest, after which she is towed into dry dock and examined for injury. The final phase is now entered upon, which consists in installing the machinery, funnels, masts, lifeboats, and internal fittings.

Ships have been occasionally launched almost completed, but for a sizable vessel this is a very risky procedure. In narrow rivers, ships are often launched sideways in a cradle, and small ships, e.g. submarines, are sometimes built in a dry dock and floated out when completed. Welding instead of riveting has been tried, but is not popular in Britain.

Shipbuilding Methods in the World Wars.—During the First World War quite a number of vessels were constructed of reinforced concrete, and one of the following methods was used: (1) ships made monolithically, and (2) ships made in cast portions, which were raised and cemented together. A reinforced concrete ship is limited in size by its excessive weight, but is cheap to build and was of value in wartime when steel was scarce. Such vessels look clumsy, are inclined to be 'dead' or sluggish in the water, and have small

relative cargo capacity. On the other hand, repairs are simple to carry out and the vessel can be made quite watertight, whilst there is, of course, no trouble due to corrosion, such as occurs with steel ships, provided that the concrete is carefully made with a good aggregate cement, and not too much water. The ship is built with particularly robust transverse members tied by long longitudinals, whilst the sides have one or two layers of wire netting or expanded metal for reinforcement.

As early as the spring of 1912 Britain's war losses of shipping totalled a third of her mercantile marine, and she had begun the war with 2000 fewer sea-going ships than in 1914, and with barely a third of the workers employed in 1918. On the ability of Brit. and Amer. shipyards to replace losses, naval and mercantile, and to repair damaged vessels and, furthermore, to increase the strength of both these services, depended the very issue of the war. The shipbuilding industry in Britain had languished between the wars, and unemployment in the yards was rife. Yet now the industry was confronted with this tremendous task. The shipyards therefore first concentrated on those types of ships with which they were most familiar, and the rest was helped by the fact that for sev. years individual shipbuilders had produced semi-standardised ships, e.g. some specialised in tankers, others in refrigerated ships, and, on these general types the wartime programme was based, while avoiding over-standardisation. Seven prin. types of wartime merchant ships evolved. Chief of these was a tramp ship or cargo vessel, with capacity of 10,000 tons deadweight, propelled by steam reciprocating, or triple expansion engines. These could be produced in six months by employing special construction methods involving the system of prefabrication. With prefabrication, sections of different sizes are constructed on the ground, or even at outside engineering works, and then hoisted by crane into place, and joined up to the main structure. Thus there were prefabricated bulkheads, stern sections, double bottom, and tank tops, etc. In America prefabrication was adopted on a very large scale, there being ample room for extending yards. Ships were assembled in great sections weighing as much as 40 tons. Practically all joints and plates were welded together instead of being riveted. This made for speedier construction, because it was easier to train welders than riveters. Tramp ships were delivered by Amer. yards in under seven weeks from keel-laying. In Sept. 1912, ten days after its keel was laid, a 10,500-ton cargo ship was launched at Henry Kaiser's Pacific Coast shipyard, a result made possible only by unremitting labour in shifts for seven days a week. Labour on this scale was impossible in Brit. yards, even with the great increase in the employment of women in rivet-heating, welding, and machine-shop labour, and furthermore, the requirements of the naval programme made great inroads on mercantile production. Yet the output per man of the Brit. shipyard worker was the

highest in the world. Ship-repairing was equally essential to the Brit. war effort. It was stated that in the first three years 23,000 warship repairs and refits were effected; 35,000 merchant ships and 140,000,000 tons gross were restored to service. A ship repairer, though not necessarily a shipbuilder, must be able to apply the knowledge and skill of shipbuilders who specialise in different classes of craft; he must, for example, be a skilled engineer and boilermaker, capable of handling different types of marine engines, and able to solve technical and structural problems on his own. Like shipbuilding, ship-repairing in the Second World War gained much by efficient direction and control, which meant that existing facilities were employed to the greatest advantage, that methods were the best, and that plant was modernised. Conversions, as well as repairs, involved extensive work out of all proportion to that carried out in 1914-15. This was especially true of major conversions, such as those of passenger liners into auxiliary cruisers or into troop transports and hospital ships, and, to a less extent, of the conversion of trawlers and excursion steamers into minesweepers or minelayers.

A special feature of shipbuilding in the Second World War was the construction of great numbers of elaborate landing-craft, which could discharge quickly upon open beaches, not only the personnel, but the heavy weapons and equipment, of a large army. Design constantly changed according to experience. Many were built in Britain, particularly for the invasion of Sicily and Normandy, but it is doubtful whether these craft could have been supplied in sufficient numbers or within any useful period but for the remarkable applications of mass production to shipbuilding, which had been evolved in Amer. shipyards by Henry Kaiser and others in response to the previous demand for replacing merchant tonnage; another interesting feature of wartime construction was the large number of small naval vessels which were built of timber, many of them being pre-fabricated and assembled inland.

Future Trends.—With the increasing use of aircraft as a means of rapid transport for passengers and mails, it seems clear that the shipping industry will look for faster passenger ships with which to meet the competition from aircraft. This will call for new methods of propulsion, and new designs of hull.

A small naval vessel has been successfully driven by jet propulsion, and a naval frigate has been fitted with the largest marine gas-turbine ever built in Britain. Gas-turbines are also being used for the auxiliary machinery. It seems likely, therefore, that the passenger liner of the future will be jet-propelled, steam-lined totally enclosed, and fully air-conditioned. In regard to refrigerated ships and oil tankers, the trend is likely to be towards larger ships, with a view to reducing the operating cost per ton of cargo carried. Of new tramps it can safely be said that the predominant feature will be low-operating

costs with a sacrifice, if necessary, of speed. An Amer., Garr Wood, a former speedboat ace, has produced a novel craft, the *Venture*, 188 ft. long, 40 ft. wide, and standing on twin hulls, which cut through the waves instead of riding them. He claims that a 16,000-ton ship would carry 4000 passengers across the Atlantic at 38 knots without pitching or rolling.

Shipbuilding Statistics.—The size of the Brit. mercantile marine, including sailing vessels as well as steamers and motor ships, is shown in the following table:

Year	No.	Gross Tons
June 1938	30,990	67,846,511
June 1939	31,186	69,439,659
June 1948	30,405	81,074,188
June 1949	31,253	83,346,165

The following table shows the number and tonnage of steamers and motorships launched in the world in 1949. (Figures for Germany and the U.S.S.R. were not available.) In 1918 launchings were 872, with a gross tonnage of 2,309,743.

This table is reprinted from Lloyd's Register's Annual Summary of Mercantile Shipbuilding for 1949. The tables on pages 612 and 616 have been compiled by Lloyd's Register of Shipping from the entries in *Lloyd's Register Book*, which includes records of all seagoing merchant ships of 100 tons and upwards.

See also BOILERS; MOTOR BOATS; MOTOR SHIPS; NAVY AND NAVIES; SAILS AND RIGGING; SCREW PROPELLER; STEAM ENGINES; SUBMARINES; TURBINES; STEAM; YACHT.

See Sir E. J. Reed, *The Stability of Ships*, 1885; T. H. Biles, *The Design and Construction of Ships*, 1908; E. Kettle Chatterton, *Sailing Ships and their Story*, 1909; N. J. McDermaid, *Shipyard Practice as Applied to Warship Construction*, 1917; E. L. Attwood and I. C. Cooper, *Laying Off*, 1918; T. Walton, *Present Day Shipbuilding*, 1921; E. L. Attwood, *Theoretical Naval Architecture*, 1922; E. W. Hobbs, *Sailing Ships*, 1925, and *Model Power Boats*, 1929; J. Anderson, *Last Survivors in Sail*, 1933; W. J. Luscombe and L. J. Bird, *Canoing*, 1936, 1948; E. C. Smith, *Short History of Naval and Marine Engineering*, 1938, Sir A. Hurd (ed.),

Country of Build		Steamers		Motorships		Total		
		Steel		Steel		No.	Gross Tonnage	Percentage of World Tonnage
		No.	Gross Tonnage	No.	Gross Tonnage			
BRITISH COMMONWEALTH	GREAT BRITAIN & N. IRELAND	139	435,807	181	831,660	320	1,267,467	40.17
	AUSTRALIA	5	19,204	2	724			
	CANADA	3	8,072	14	35,821	41	101,747	3.25
	Coast Great Lakes	2	23,994	1	165			
	OTHER COMMONWEALTH COUNTRIES	3	10,351	3	1,787			
ARGENTINA								
BELGIUM		1	515	15	44,887	16	45,402	1.45
CHINA								
DENMARK		2	6,982	20	78,269	22	85,251	2.75
FINLAND		11	10,563	2	1,160	13	11,723	0.38
FRANCE		15	39,150	41	115,709	56	154,859	4.94
HOLLAND		9	15,217	91	154,078	100	169,295	5.41
ITALY		5	23,145	39	75,016	44	98,161	3.17
JAPAN		57	120,916	27	27,058	84	147,974	4.72
NORWAY		9	18,678	26	38,507	35	57,185	1.89
POLAND		6	7,160			6	7,160	0.24
PORTUGAL				2	3,150	2	3,150	0.10
SPAIN		2	134	25	14,990	27	15,124	0.49
SWEDEN		3	2,800	67	320,162	70	322,962	10.32
UNITED STATES OF AMERICA								
Atlantic Coast		37	606,060	12	6,137	66	633,306	20.22
Gulf Ports		1	4,300	10	2,860			
Pacific Coast								
Great Lakes		1	12,730	5	1,219			
URUGUAY								
YUGOSLAVIA				2	6,398	2	6,398	0.20
TOTALS		311	1,366,382	588	1,759,751	926	3,131,805	100.00

STEAMERS AND MOTORSHIPS LAUNCHED IN THE WORLD DURING 1949

Britain's Merchant Navy, 1942; F. C. Bowen, *From Carrack to Clipper*, 1948; R. and R. C. Anderson, *The Sailing Ship*, 1948; Sir W. Abell, *The Shipwright's Trade*, 1948; G. S. Baker, *The Merchant Ship*, 1948; C. Barnaby, *Basic Naval Architecture*, 1949; A. C. Hardy, *Book of the Ship*, 1949; and Sir A. Grant, *Steel and Ships*, 1950.

Ship's Company. The whole of the number of officers and men on board a naval vessel when in commission form the S. C. The number in the company, of course, varies with the size of the vessel, ranging from about 20 in a motor torpedo boat to 1500 or more in a fleet carrier. Taking, for example, a battleship not carrying a flag officer and his staff, the company includes the captain, who is in charge of the entire ship, and every one in it, the commander who is second in command, six or more lieutenant-commanders, and an approximately equal number of lieutenants, all of the executive branch, eight to ten engineer officers, three Royal Marine officers, up to four supply officers, surgeons, instructor officers, a chaplain, and perhaps as many as thirty midshipmen, and one or more sub-lieutenants. There are also the branch (late warrant) officers, who comprise the gunner, shipwright, boatswain, etc. Below the branch officers come the chief and petty officers who also incorporate the majority of the artisan ratings; then the leading rates, chiefly in the seamen, stoker, and communications branches, and finally the able and ordinary seamen, the stokers, marines, signalmen, telegraphists, and boys. In wartime the S. C. is considerably enlarged.

Shipshaw, greatest hydro-electric plant in Canada, situated on the Saguenay R., Quebec (q.v.).

Shipton, Eric Earle, b. 1907, Brit. mountaineer, distinguished for the part he has played in four attempts on Mt. Everest, and for other Himalayan climbs and exploration, especially the ascent of Kamet and reconnaissance of Nanda Devi. See his books *Nanda Devi* (1936), and *Upon that Mountain* (1943).

Shipton, Mother, reputed prophetess, was probably a mythical character. She is first mentioned in 1641 as having foretold the death of Wolsey, and she is also said to have predicted the Civil war and the Fire of London in 1666. According to S. Baker, who ed. her 'prophecies' (1797), she was born in 1488 at Knaresborough, and lived for over seventy years, having married Tony S., a builder, in 1512. See W. H. Harrison, *Mother Shipton Investigated*, 1881, and Sir Sidney Lee's article in the *Dictionary of National Biography*.

Ship-worm, see TEREDO.

Shipwrecks, see WRECKS.

Shiraz, anet. walled city of Persia, cap. of the prov. of Fars. It is an important trading centre, and is famous for its wine (made from the grapes of the Khullar vineyards) and its roses. There are manufs. of cotton goods, glass, attar of roses, and inland fancy articles. The tn. is subject to earthquakes. Here is one of the gov. wireless stations. Pop. 129,000.

Shire, see COUNTY.

Shiré, riv. of S. Africa which issues from the S.E. of Lake Nyasa, and after a course S. joins the Zambezi. A railway runs along the r. b. of the riv. connecting Port Herald, the chief customs station of Nyasaland, with Chiromo, and thence by a steel bridge, with a lifting span of 100 ft., which crosses the riv. at this point to Blantyre (opened in 1908).

Shire Breed, see under HORSE.

Shirley, Sir Anthony (1565-r. 1635), brother of Sir Thomas and Sir Robert S., he made various expeditions to foreign countries, notably to Persia, concerning which he pub. *Sir Anthony Shirley: his Relation of his Travels into Persia* (1613).

Shirley, James (1596-1666), Eng. dramatist and poet, b. in London, and educated at Merchant Taylors' and afterwards at St. John's College, Oxford, and also at Catherine Hall, Cambridge. With the profession of playwright he combined that of schoolmaster. His death was the consequence of shock, resulting from the Fire of London. As a dramatist S. is generally known as the last of the Elizabethans, his birth just bringing him within Elizabeth's reign. Both in comedy and tragedy he avoided the extremes which were at once the best and worst features of Elizabethan drama, and retained the ornament and elegance. He lacked great originality, but his chief virtue is the integrity and ease of his verse. His first play, *Lore Trucks*, he wrote in 1625, and continued writing for some forty years until the tradition was old-fashioned and his work was voted dull for that reason. He produced a great number of plays and masques, including *The Traylor* (1635); *The Gamester* (1637); *The Lady of Pleasure* (1637); and *The Sisters* (1652). His dramatic works and poems were ed. by A. Dye (1833); also by E. Gosse (Mermaid ed., six plays, 1888). See R. S. Forsythe, *Shirley's Plays in their Relation to the Elizabethan Drama*, 1914; A. H. Nason, *James Shirley, Dramatist*, 1915; and study, with bibliography, by S. A. and D. R. Tannenbaum, 1916.

Shirley, Lawrence, see FERRERS, LAWRENCE SHIRLEY, EARL.

Shishak, name given in the Book of Kings to Shishang I. (q.v.).

Shitta (or Shittim) Wood, wood of some species of acacia, from which the Tabernacle was largely constructed.

Shizuoka, tn. of Honshu, Japan, cap. of the prefecture of the same name, 95 m. S.W. of Tokyo. Bamboo and lacquer goods are produced, and tea is grown. Pop. 151,200.

Shkoder, see SCUTARI.

Shoa, prov. of S. Abyssinia, formerly an independent kingdom until its conquest by Theodore of Abyssinia in 1855. It is traversed by the Blue Nile, is partly mountainous and partly flat, and produces oranges, bananas, and citrons, as well as gold and iron. The cap., Addis Ababa, is the seat of government for the whole empire. Pop. at out 1,600,000.

Shock, sudden depression of the activities of the system. The condition may vary in intensity and duration, and may be produced by an intense sensation, as in

severe wounding, burns, etc., or by emotional excitement. In grave cases the condition known as collapse is produced, in which the patient is incapable of any exertion and sometimes of sensation. A similar condition is induced by excessive loss of blood. The immediate cause of S. is an abnormal stimulation of the medulla oblongata; the nerve centres become so depressed that muscular action, both voluntary and involuntary, is sluggish and incomplete. The respiratory movements are consequently disturbed, and the interference with the ordinary circulatory processes causes the blood to gravitate to the large vessels of the abdomen, the superficial blood-vessels of those of the brain being ill supplied. The condition is demonstrated by the weak pulse, pale appearance, and drowsy or insensible state of the patient. A reaction may follow more or less speedily, but there is always danger, in severe cases, of death by exhaustion. The patient should be placed with the head low, and the limbs somewhat elevated. Heat should be applied to the extremities, and stimulants administered. If the patient cannot swallow, ether or brandy should be injected subcutaneously. A transfusion of saline or blood is also useful.

Shock, Electric, see under RESUSCITATION.

Shoddy, kind of soft woollen goods made from old woollen rags. Dewsbury is the Eng. centre of the industry. The term is also applied to the waste thrown off during the process of wool manuf. In common parlance the word has come to refer to any poor material; and figuratively.

Shoe-bill, see BALENICES.

Shoeblocking, see BLACKING.

Shoeburyness, small tn. and seaside resort on the N. side of the Thames estuary, on the coast of Essex, England. It is now a dist. of the co. bor. of Southend-on-Sea, having been incorporated within the bor. boundaries in 1933.

Shoes, see BOOTS AND SHOES; for horses, FARRIERY.

Shofar, anc. Jewish wind instrument, made of a ram's horn, still used in the synagogue.

Shogun, Jap. word which was at first applied only to generals. From 1603 till 1867 the S. was in reality the ruler of Japan, although the mikado retained nominal supremacy. In 1867 the revolution restored real power to the mikado.

Shola, or *Sola* (*Aechynomene aspera*), aquatic leguminous Indian bush, the pith of which is used for making the light helmets worn by Europeans in the tropics.

Sholapur, agric. dist. in the Deccan div. of Bombay, India, with cotton manufs. at Baral. Area 1572 sq. m. Pop. 1,014,700. The city of S., which is an important road centre, has a pop. of 212,600.

Sholokhov, Mikhail (b. 1905). Russian author, son of a Don Cossack, b. at Krushlino, a hamlet on the outskirts of Veshenskaya. In 1926, with the pub. of the first vol. of his novel *And Quiet Flows the Don* (1934), he was acclaimed one of the new Russia's literary geniuses. In

1940 *The Don Flows Home to the Sea* was pub., and in 1942 both books appeared in one vol. as *The Silent Don*. A more mature work, *Virgin Soil Upturned* (1935), deals profoundly with the great problem of rural Russia, the collectivisation of agriculture. This novel is more than an economic treatise on a passing epoch; it is a living picture of the agonies of the kulak, the anxieties of the peasant in the uprooting of private interests in favour of the doctrine of the common good.

Shooter's Hill, prominent hill in Woolwich, London, 446 ft. high.

Shooting, as a sport, is of comparatively recent date; it was not practised at all until the seventeenth century, and was not popular until late in the eighteenth century. The sport has increased steadily in popularity, and the art of gun-making has proportionately improved. S. 'over dogs' is not so much practised now as formerly, the birds being generally 'driven' over the guns, though partridges are still shot over dogs in many cases. In addition to rabbits and hares, the game shot in Great Britain includes grouse, partridges, and pheasants, and, in 'shore-shooting,' the different varieties of sea-birds found on the coast. The skilful use of the shot-gun requires good nerve, good eyesight, and much practice. The best method is the 'snap' or 'hold-on' system, in which the gun is fired at the instant it is brought to the shoulder, allowance for direction, speed, etc., being made automatically. The practice of 'following' the game with the gun is to be deprecated. See also GROUSE-SHOOTING; GUN; PHEASANT; PARTRIDGE; RIFLE, etc. See A. Maxwell, *Pheasants and Covert Shooting*, 1913; Sir H. Newbolt, *The Book of Good Hunting*, 1925; F. C. Selous, *Partridges Yesterday and To-day*, 1927; E. Parker, *Shooting Days*, 1932; H. B. C. Pollard, *Game-birds and Game-bird Shooting*, 1936; and N. M. Sedgwick, *A Shooting Man's Fear*, 1918.

Shooting Stars, see METEORS.

Shops Acts. Prior to the consolidating Act of 1912, an Act of 1892 provided for a maximum period of weekly employment of 72 hrs., an Act of 1904 empowered local authorities to make 'closing orders' for the early closing of shops in their dists., and an Act of 1911 introduced the principle of the weekly half-holiday. But the Act of 1912 is a more beneficent measure in that it makes the half-holiday obligatory, and insists on definite hours for meals. It is curious, however, that the working week should have been extended by 2 hrs. The provisions as to employment of persons under eighteen years of age were repealed by the Act of 1931, which provides a normal maximum week of 48 hrs. for young persons employed in wholesale or in retail shops, with special provisions for seasonal or exceptional pressure. The main (unrepealed) provisions of the Act of 1912 are these: Shops which employ female assistants must contain not less than one seat to every three female assistants (fine £3, and upwards of £5 for subsequent

offences). On one day, at least, in each week a shop assistant is entitled to a half-holiday, or in other words, may not be employed after 1.30 p.m. Intervals for meals must be so arranged as to secure that no assistant shall be employed for more than six hours without an interval of at least twenty minutes during the course thereof; further where the hours include those from 11.30 a.m. to 2.30 p.m., three-quarters of an hour must be allowed for dinner, and where they include from 4 p.m. to 7 p.m., half an hour for tea. (Fines for contravention range from £1 to £10.) Every shop to which the Act applies must, subject to the provisions of the Act, close at 1 p.m. on one day in every week, and the local authority may make an order fixing the particular week-day. Many trades and businesses are, however, absolutely exempted by the Act from the provisions as to the weekly half-holiday. These include businesses for the sale of newspapers, meat, fish, milk, cream, bread, fruit, and other perishables; medicines and surgical appliances; motor, cycle, and aircraft accessories; intoxicants (retail), refreshments, tobacco, etc. If the postmaster-general so certifies in any particular case, shops or other places where post-office business is transacted may also be exempted. The Act applies with modifications to Scotland. By the Shops Act of 1928 the 'general closing hours' are 9 p.m. for one 'late day' in the week and 8 p.m. for every other day. The late day must be Saturday, unless the local authority fixes another day. But if, under the prin. Act, they have fixed any particular day as the weekly half-holiday for any particular class of shop, they must choose some other day for the late day. Special exceptions may be made in holiday resorts, with due safeguards for the shop assistants affected, and in certain trades, such as those dealing in refreshments, tobacco, and other perishable goods. Serving a customer after closing time is permissible if the customer was in the shop before the closing time; or, again, when the shop-keeper had reasonable grounds for believing that the article supplied after the closing hour was required in the case of illness. Sunday closing, except in certain special areas inhabited largely by a Jewish pop., is made compulsory for most shops by an Act of 1937.

Shop Stewards, also known as **Shop Secretaries**, or **Works Representatives**, local representatives in the United Kingdom of the members of a trade union employed in a single place of work, e.g. a factory or 'shop.' They are an important link in the local organisation of a trade union. In some unions, mainly in the engineering and allied industries, they play a larger part than in others. During the First World War the trade unions agreed to an industrial truce, and the powers of the S. S. increased, since negotiations in disputes were conducted through them. With the return to normal working conditions their authority declined, although their numbers increased. During the Second World War they again

came to the fore in helping to secure the maximum industrial output within acceptable conditions of service. Their duties include the inspection of contribution cards and the recruitment of new members. They are also responsible for submitting reports to the dist. committee of the trade union concerned on affairs which require handling at a higher level, and for ensuring that the provisions of any agreement between the trade union and the employer are carried out. As the elected representatives at the place of work, they often act as spokesmen in the presenting of grievances to the employer, and by negotiating a settlement on the spot prevent disputes from spreading.

Shore, Jane (d. 1527), mistress of Edward IV., b. in London, was the daughter of a mercer and the wife of a goldsmith. After the king's death she was accused by Richard III. of sorcery and compelled to do penance (1483). She died in poverty.

Shore, John, *see* TEIGNMOUTH, BARON.

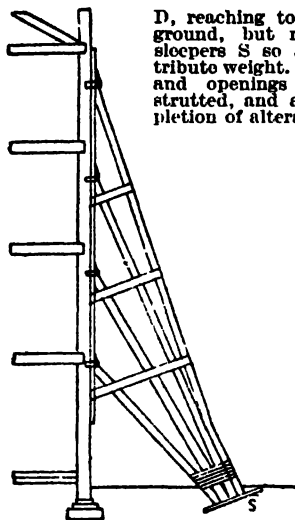
Shore, *see* SEASHORE.

Shoreditch, metropolitan bor. of N.E. London, having an area of 657.6 ac. and a pop. of 53,700. It was formerly a parl. bor. returning two members, but under the Representation of the People Act (1948), it was joined to Finsbury, and they together return one member.

Shoreham-by-Sea, seaport of Sussex, England, with shipbuilding and coal and timber trade, at the mouth of the Adur, 6 m. W. of Brighton. In medieval times it was an important port. Pop. 14,300.

Shoring (from *shore*, a prop), name given to the operations in building which are carried on to support temporarily part of a building during the repairing of another part, or of an adjacent building, etc. There are three main types of shoring: raking shore; horizontal shore or flying shore; needle, vertical, or dead shore.

Shoring is resorted to when the walls have become unsafe and have temporarily been deprived of their supports, to prevent collapse while repairs are in progress. Fig. 1 shows an example of *raking shores*: the timbers are usually placed at angles of 60° to 75°, and at horizontal distances apart of about 8 ft. The sole pieces are not quite at right angles to the shore resting on them, but at a slight inclination which facilitates levering for tightening up; on bad ground it is necessary to prepare a foundation for them. *Horizontal or flying shores* are shown in Fig. 2; they are used between walls when removing, e.g. a house from between two others. Wall plates are fixed and horizontal shores placed between, strengthened by struts. *Underpinning* is carried out when the upper part of walls requires support, during removal or alteration of the lower part. Fig. 3 shows section and elevation of such work: the floors are strutted to relieve the wall of all but its own weight, and raking shores R are fixed. Long and strong needles N are then fixed through the wall above the part to be removed, and supported within and without the building by strong timbers, dead shores



D, reaching to the solid ground, but resting on sleepers S so as to distribute weight. Windows and openings must be strutted, and after completion of alterations, the

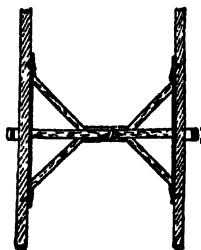
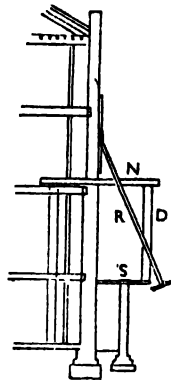


FIG. 1 (left). RAKING SHORES

FIG. 2 (above). HORIZONTAL FLYING SHORES

FIG. 3 (right). UNDERPINNING



temporary work must be taken away gradually piece by piece.

Another means of supporting a weakened part of a building, although not in the category of shoring, is that of the tie bars. An iron bar, threaded at both ends, passes through a wall and is secured by plates, often of S shape, to another support or wall. Nuts are screwed to the bolt, making the whole assembly tight and safe. During the two world wars bomb damage made the practice of shoring extremely important, both in rendering buildings safe for rescue work and in temporary repairs.

Short Brothers & Harland Limited, Eng. aircraft firm, set up in 1908, at Leysdown in the Isle of Sheppey. Six aircraft built to the design of Wilbur and Orville Wright estab. S. B. & H.'s claim to be the first manufacturers of aircraft in the world. During the First World War they produced aircraft in quantity for the allied powers, specialising in seaplanes for the R.N.A.S. and number of airships. Between the wars they engaged in a programme of aeronautical research, particularly in the field of flying boats, in which sphere they are now pre-eminent. During these years they built the world's first all-metal stressed-skin aircraft, the first all-metal flying boat, and conducted many other experiments, culminating in the famous Empire class flying-boat, twenty-eight of which were supplied to Imperial Airways in 1937. During the Second World War they manufactured in quantity the Stirling four-engined heavy bomber and the Sunderland long-range reconnaissance flying-boat, still (1950) in service with the R.A.F.

Short, Sir Francis Job (1857-1945), Eng. engraver *b.* at Worcester. Originally trained as an engineer, he became an

associate of the Institute of Civil Engineers in 1883, but directing his studies towards art, he was elected fellow of the Royal Society of Painter-Etchers and Engravers in 1885 and became president in 1910, succeeding Sir Seymour Haden, the founder. In 1906 he was elected

associate of the R.A. and member in 1911, in which year he was knighted. A master craftsman, he more than any contemporary artist furthered the art of etching, aquatint, and mezzotint. He taught for thirty years at the Royal College of Art, and became head of the School of Engraving from its creation within the R.C.A. in 1913, largely at his instigation, until 1924. See life by M. C. Salaman, 1925.

Short Circuit. The condition set up when two terminals of a source of electricity or the conductors from that source are connected through a path of negligible resistance.

Shorter, Clement King (1857-1926), Eng. journalist and author; *b.* in London; he turned to journalism after thirteen years in the civil service (1877-90). Ed.: *Illustrated London News* (1891-1900); *Sketch* (1893-1900); *Sphere* (1900-26). His writings include *Charlotte Brontë and her Circle* (1896); *Life of George Borrow* (1911); *Autobiography* (1924).

Shorthand, or **Stenography** (Gk. *στίφος*, narrow, and *γραφία*, writing), terms applied to methods of symbol writing designed to save time and space, and particularly to enable the hand to keep pace with ordinary speech, in other words, to write at the rate of speech. Other terms are *Phonography* (I. Pitman, 1833), *Stenophonomography* (A. M. Bell, 1852), *Brachygraphy* (Gk. *βραχυς*, short), *Tachygraphy* (Gk. *ταχύς*, speedy), and *Semctography* (Gk. *σημειον*, sign), but they are rarely used. Modern stenography (this term was first used by John Willis in *The Art of Stenography, or Short Writing, by Spelling Characters*, 1602) was born in England, but various kinds of S. were already practised in ant. times by the Gks. and by the Romans, and perhaps also in ant. Israel. A Gk. inscription (*Corp. Inscript. Attic*, IV.,

4321), discovered in 1883 on the acropolis of Athens, and assigned to c. 350 B.C., seems to contain shortened consonants. Another attempt at S. writing may be seen in fragmentary inscriptions from Delphi, assigned to the end of the same century. The translators of the Septuagint, in the third century B.C., rendered the expression 'ready writer,' in Psalm xlv., by words meaning 'S. scribe.' The Rom. historian Suetonius attributes to the poet Quintus Ennius (239-169 B.C.) the creation of the first 1100 *nota vulgares* (the Lat. term for S. was *note* or *ars notaria*; stenographers were termed *notarii* or *cursores*). The earliest positive mention of Lat. S. dates from the first century B.C. M. Tullius Tiro, *libertus* (freed slave) who was the secretary of Cicero, invented a system of S., in which to make notes of his master's letters and orations. He gave his name to the *note Tironianæ*. The method consisted of complex groups of letters and arbitrary signs; collections of these survive in medieval MSS. Suetonius attributes the completion of the Tironian notes to the *liberti* Vipsanius Filagrius and Aquila (late first century B.C.) and to the philosopher Seneca (c. 4 B.C.-A.D. 65), who is said to have collected the various *note* known at his time, to the number of 5000. S. appears to have been taught in schools under the Empire; and the Emperor Titus himself is said to have been expert in writing it. Down to the ninth century these notes appear to have been in common use. The earliest extant document, however, which contains Tironian notes belongs to A.D. 362. The Tironian notes produced a new development of Gk. tachygraphy, and proof of the use of S. by the Gks. is furnished in the Oxyrhynchus contract (A.D. 155), found by the Egypt Exploration Fund in 1904; by this a municipal officer apprenticed his slave for two years to a S. writer to be taught his art. Gk. tachygraphy mainly flourished in the third to sixth centuries, and was employed by the early Christians to take down the sermons, the acts of councils, the lives of martyrs, etc. The latest extant Gk. tachygraphic documents belong to the twelfth century A.D.

Out of the Tironian notes there arose in the third and fourth centuries the Lat. syllable S., which was easier and simpler than the former. The earliest extant document showing syllable tachygraphy is a papyrus (Ravenna), belonging to A.D. 540; the latest documents belong to the eleventh century. During the Middle Ages not very much was done in this field. Mention may be made of the *nota juris* and the increasing number of the abbreviations (*q.r.*) and contractions, which were already largely used by the Gks., Romans, and Jews. The oldest forms of Gk. or Lat. contraction are a straight line over the word or a curve, which indicate that a portion of the word only is present; a curved line over the end syllable of a word means that one or more letters are omitted at the end of the word. In Heb. MSS., and sometimes in other MSS., the dot or the apostrophe are used to denote abbreviation. In Lat. MSS.

certain signs of contraction are fairly constant in their meanings, always taking the place of special syllables (*e.g.* a bold apostrophe above the line indicates *er*, *tr*, or *re*); a small letter over a word shows that a syllable is left out of which this letter formed part.

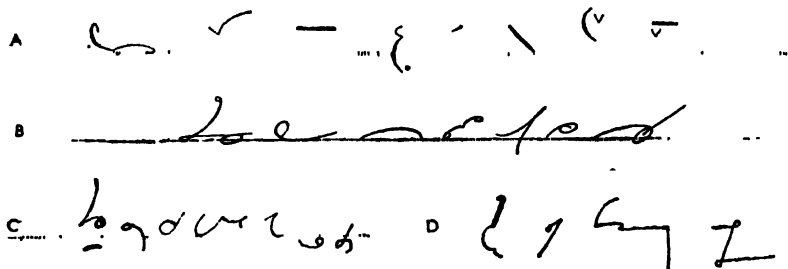
About 1174 the Eng. monk John of Tilbury pub. a book on *Ars notaria Aristotelis*, but the method was more suited to cryptographic than S. purposes. In the fifteenth to sixteenth centuries and the early eleventh century there was a partial revival of the Tironian notes (Johannes Trithemius, 1462-1516; Justus Lipsius, 1547-1606); Jan Gruter pub. in 1603 a collection of about 13,000 Tironian notes. The modern use of S. is coincident with the revival of learning. Timothy Bright, doctor of medicine and clergyman, pub. the first Eng. book on S. in 1588, dedicated to Queen Elizabeth (*Characterie: an Art of Short, Swift, and Secret Writing by Character*). It contained 500 symbols for words. The work of the contemporary Ratcliff de Plymouth appeared 100 years after his death (1688). P. Bales pub. *The Writing Schoolmaster*, 1591, and *The Art of Brachygraphy*, 1597. The 'father' of modern S., however, is the Rev. John Willis (1575-1627), a London clergyman, who gave an alphabet of S. characters corresponding to the letters of the Rom. alphabet. Many systems followed in the next 300 years. Over 500 professed systems have been advanced in England, and a large number have appeared in the U.S.A. and other Eng.-speaking countries, bringing the total to some 1100. Early in the eighteenth century some authors enlarged their alphabet by giving signs for *ch*, *sh*, and *th*. An early Eng. method (1672) was that of Wm. Mason, a writing master, adopted by the founder of the house of Gurney, and used in the trial of Warren Hastings. Mason was the first to discover the value of a small circle for S. in addition to its proper alphabet sign. Among sev. other systems in vogue in England in the eighteenth century, the more important were those of John Byron (*q.r.*), distinguished for its precision, systematic construction, and elegance. Samuel Taylor, whose *Universal System of Stenography* (1786) did more than any of the earlier systems to estab. the art in England and abroad (in Taylor's system no letter has more than one sign, except *w*, which has two); and Wm. Mavor, whose *Universal Stenography* (1780) differs from Taylor's in the alphabet, and in a more definite method of marking the vowels, some being indicated by dots, and some by commas, whereas Taylor expressed all the vowels alike by a dot in any position.

In 1837 Isaac Pitman (1813-97) issued the first ed. of the most celebrated S. system. His book, entitled *Stenographic Sound Hand*, was pub. at 4d. by Samuel Bagster, the publisher of Bagster's Bibles. In the second ed. (1840) the title was changed from 'sound-hand' to 'phonography,' a Gk. compound having the same meaning. This pub. effected a revolution in Eng. S. methods. Instead of allotting

symbols to represent the letters of the common alphabet of five vowels and twenty-one consonants, Pitman ascertained all the broad, typical sounds heard in spoken Eng., and classified them in an enlarged alphabet of twenty-four consonants, including the aspirate, and twelve vowels. He used geometrical straight strokes and curves as symbols for the consonants, and these were grouped in pairs to indicate similar sounds having a light and heavy pronunciation respectively. For vowel notation a scale of three dots or dashes, placed at the sides of the consonant strokes, was devised. On this foundation Pitman grafted a number of abbreviating devices, which included small hooks to indicate the addition of *r* and *l* to each of the consonants. *S*, letters written singly represented words of frequent occurrence, termed grammalogues, a more satisfactory plan than that

It has become virtually the standard *S*. system in the U.S.A. since its introduction in 1893. Adaptations to many foreign languages have been pub., a *Sp.* adaptation being especially popular in South America. The system is in world-wide use for parl. journalistic and commercial purposes. Its writers won the ann. world championship competitions conducted by the National *S.* Reporters' Association in 1921, and from 1923 to 1927 (since discontinued), at speeds up to 280 words per min. A Gregg writer has received the highest award for any independent public examining body in Great Britain.

Dutton *S.* was invented by Reginald J. C. Dutton (b. 1886) in 1916. The system is geometric and phonetic. All vowels are joined in their natural order in the outline, being expressed either by small or large circles, two-sided or half-staples, or hooks in specified positions.



EVERYMAN I WILL GO WITH THREE AND BE THY GUIDE

A transcription of the Lvcrrman motto in four systems of shorthand: A, Pitman; B, Gregg; C Dutton; D, Sloan-Duployan

of older authors, who used arbitrary non-alphabetic signs in such cases. It has come into practically universal use for Eng. parl., newspaper, and legal reporting, and for correspondence dictation throughout countries under Brit. influence. It has been applied to twenty languages, and adaptations have been used in reporting the legislatures of Japan and Argentina. In 1922 Nathan Behrin won the New York State championship at 250 and 300 words per min. with 99.64 per cent accuracy. The Graham and Munson systems are variations of Pitman's *S*.

The Gregg system, first pub. by Dr. John Robert Gregg (1868-1948) in *Light-Line Phonography* (1888), is the most widely used system of *S.* in the world. It is phonetic, and the characters representing the spoken sounds are written in a cursive style based on the ordinary movement of fluent hand-writing. The vowels and the consonants are joined together in their spoken sequence; there is no 'thickening' to distinguish similar pairs of sounds, and no position writing. The 'blending' of merging pairs of consonants (*pr*, *pl*, and *br*, *bl*) is an outstanding feature. These factors make the system extremely simple to learn, fluent to write, and, because of the 'writing-in' of vowels, easy to read.

The average time taken by students to work through the entire theory of the system is from 24 to 30 hrs. of actual study. This is achieved principally by the application of six fundamental rules for dealing with the many Eng. syllables which end in *-r*, *-l*, *-s*, *-n*, *-t*, and *-d*. Both *r* and *l* are automatically added to a consonant stroke by doubling its length, *l* being differentiated by position. *S* and *n* are both added by thickening, *n* again being differentiated by position. *P* is represented by a small hook in specific positions, and *d* by a large hook. The system has been adapted to Romance and Teutonic languages. Dutton writers have gained first place in the United Kingdom in the Union of Educational Institutions examinations, and silver medals in the Royal Society of Arts highest speed tests. Dutton World Speedwords (1942) is written in the ordinary longhand letters of the Rom. alphabet. World Speedwords is built up on a foundation of only 493 1-, 2-, 3-letter word-roots in international use. Thus, the 2-letter radical *ri* is a natural abbreviation, not merely of Eng. 'write', but also of Fr. 'écrire', Sp. 'escribir', It. 'scrivere', Ger. 'schreiben', Dutch 'schrijven', Rumanian 'scrie', and Scandinavian 'skrive'. The vocabulary is extended by employing of

twenty-two 1-letter suffixes, and compounds. The high-frequency particles, pronouns, and auxiliary verbs are represented by 1-letter Speedwords, as *b*-but, *f*-for, *h*-have, *v*-you (Fr. *vous*), *l*-the (Fr. *le*), *m*-with (Ger. *mit*).

Of the foreign widely used S. systems mention must be made: the Gabelsberger (F. X. Gabelsberg, 1789-1849), and the Deutsche Kurzschrift systems in Germany and Austria; the Marchionni, D'Urso, Meschini, and particularly the Gabelsberger-Hoß, in Italy; the Marti in Spain and Lat. America; and the Prévost-Delaunay and Duployé (E. Duployé, 1833-1913) in France. Chief among the adaptations of the system Duployé is that made by J. M. Sloan and called after him the Sloan-Duployan system. Since its introduction in 1882 the system has undoubtedly made considerable progress throughout the Eng.-speaking world. Like the Pitman system it is geometric in form, but differs in regard to vowel representation. Vowels and consonants are written in their natural order (the order of the spoken word) without necessitating a lift of the hand. A special feature is the thickening of consonants to add *r*. The *b* stroke thickened becomes *br*; the *st* sign thickened becomes *str*, and so on. With the exception of a list of about twenty or thirty simple alphabetical signs for the commonest words in the language, there are no grammalogues to be learnt. Since 1930 there have been some alterations in detail: a special *y* character has been provided, and thickened vowel-signs and upstrokes have been abandoned. The ordinary principles of the system enable sufficient brevity to be attained without the need of many grammalogues, phrases, and rules. Neither is there 'position' (i.e. writing some words above the line, others on the line, and some below the line); ruled lines are therefore not required. Edward O'Shaughnessy, the great parl. reporter, used Sloan-Duployan. Some official parl. and court reporters in the U.S.A. and the colonies also employ the system. A unique feature of the system is its adaptability for use in any foreign language. Books are pub. in fourteen languages, but many writers of the system dispense with the use of the special books, finding it a simple matter to make their own 'adaptation.' For this reason Sloan-Duployan is used to some extent in Cuba and South America, where there is a demand for stenographers able to write both Eng. and Sp. S. See J. H. Lewis, *Historical Account of Shorthand*, 1816; W. Gibson, *Brief History of Stenography*, 1877; W. P. Upham, *Brief History of the Art of Stenography*, 1877; H. L. Callendar, *Cursive Shorthand*, 1889; E. M. Thompson, *Handbook of Greek and Latin Palaeography*, 1903; I. Q. Fraser, *A Short History of Shorthand*, 1920; G. A. S. Oliver, *A Short Historical Account of the Art of Shorthand up to 1914*, 1940. Also the manuals issued by the publishers of various systems.

Shorthorn, or Durham, Breed, see under CATTLE.

Shorthouse, Joseph Henry (1834-1903),

Eng. novelist, b. in Birmingham, was a chemical manufacturer, and almost fifty when he pub. his first and finest novel, *John Inglesant* (1881). This novel subsequently gave rise to charges of considerable plagiarism. Other books are *Little Schoolmaster Mark* (1883), and *Sir Percival* (1886). See Sarah Shorthouse (ed.), *The Life, Letters, and Literary Remains of J. H. Shorthouse* (2 vols.), 1905.

Short Sight, see MYOPIA.

Short Story. The S. S. was in origin simply the narration of a small unity in the representation of life in literature. In the early literature of Asia and Asia Minor fables and fairy-tales mark the early S. S., which seems to have been distinctively a product of the E. Though folk-themes of N. Europe were incorporated in the epics, there was a tendency to expand an idea rather than to condense it. In the classical age simple, objective S. Ss. can be found in Apuleius's *Golden Ass*. The earlier fables of Aesop are derived from E. sources. The biblical tale of Ruth is an example of the S. S. One of the most beautiful of the E. collections of S. Ss. is that now called *The Arabian Nights*. Its basis is Persian, dating back to the tenth century, but the individual stories are probably Arabian, possibly systematised between the fourteenth and sixteenth centuries. Also of oriental provenance are many of the popular tales in the fourteenth-century didactic collection known as the *Gesta Romanorum* (q.v.), and written in Lat. They, and similar collections, had great indirect influence upon the western S. S., long before complete trans. reached Europe. *The Arabian Nights* shows that the S. S. of the medieval E. remained the equal, if not the superior, of its contemporary in Europe. Boccaccio, whose *Decameron* is one of the landmarks, both in the list of the novel and of the S. S., was an It., coming from the country most in contact with the Levant. His S. Ss. closely resemble E. collections in form, though for inspiration of plot he turned to the chivalric romances. The medieval secular stories in verse, of which Chaucer's *Confessio Amantis* and Chaucer's *Canterbury Tales* (which owe much to Boccaccio and to the *Gesta Romanorum*) are outstanding, were preceded by the Fr. *contes derois*, religious anecdotes in a style borrowed from the early Christian (lks). The Christians had been greatly influenced by the parables, among the most beautiful of early S. Ss. Fr. poets also produced the *lai*, a Celtic fairy story in verse, and the *fabliau*, a satirical S. S. in verse. Sev. of Chaucer's coarser stories are close analogues of the *fabliau*.

The medieval and Renaissance tale, based on folk legend or chivalric romance, set out to describe a definite happening. At its best it was simple in narrative, and, in the hands of Chaucer, afforded opportunity for brilliant characterisation and passages of great pathos. It was almost completely objective. In this rudimentary S. S. prose and rhyme were interchangeable. After the Renaissance, prose displaced verse. The conventional S. S.

continued into the Renaissance, and flourished especially in Italy. It. S. Ss. of an artificial character reached England through Wm. Painter's *The Palace of Pleasure* (1566-67). By this time the familiar themes were being played out. S. Ss. survived inside many of the earlier novels, such as those of Defoe and Sterne; but as a separate entity the form temporarily disappeared.

The writer whose influence was paramount in creating the later S. S. is Edgar Allan Poe (q.v.). He followed the tradition of the fable and the medieval tale by embarking on a direct narrative. Into it he intruded his own personality, adopting a subjective treatment, often within an objective framework. His S. S. had a finely constructed plot; it was short. The essentials were rigorously removed. Poe achieved a perfect artistic production. He possessed what many of his lesser successors lacked, the gift of making his own fantastic ideas interesting to others. His example changed the character of the S. S. and rejuvenated it. Tchekov concentrated on Poe's liberation of the author's soul; the S. S. became, in his hands, the vehicle for expressing feeling, a mirror on which emotion is caught, and reflected back again to the readers. Such S. Ss. were predominately subjective, and could only be written successfully by a particularly gifted author. With D. H. Lawrence, Katherine Mansfield, Sean O'Faolain, and Elizabeth Bowen they succeeded; but they were attempted by many inferior writers, in whose hands they deteriorated into self-conscious incoherencies. This tended to lessen the popularity of the S. S. Tchekov's apparently effortless prose, and the exquisite, fragile fragments of Lawrence and Katherine Mansfield, have a misleading simplicity which masks their true value. Such good S. Ss. were only self-conscious in the sense that the author set out to write a S. S. deliberately, and not a short novel; they were carefully planned in every detail of plot and form, however inspired emotionally. The Maupassant-Daudet school concentrated on producing concise cameos, taking their basic inspiration from Poe's mastery of form. Their treatment remained, however, severely objective; they might deal with emotional problems, but they did so dispassionately. This form remains the most usual type of Fr. S. S.

Both these developments influenced the traditional S. S., which Poe's example had revived. This has since flourished particularly in England. The humorous S. S., simply narrative in treatment, and gaining in effect through the necessary compression, was a peculiarly Amer. development. Joel Chandler Harris, Mark Twain, and O. Henry used it successfully to portray character in miniature. In Henry James, the Amer. S. S. gained greater depth, and borrowed from Tchekov; but James had no real successors. The humorous S. Ss. of Dreiser and Thurber, however, have a certain seriousness which owes something to James. The humorous S. S. in England, exemplified in the writing of W. W. Jacobs and P. G. Wodehouse, has not

generally this depth. The nineteenth century saw a revival of the fairy-tale and the fantasy. Writers in this genre include Andersen in Denmark and Barrie in England. Barrie tried to paint a picture for his reader, and presented the feelings of his characters with deep sympathy and sincerity. The tale of adventure and action was embodied in the works of Kipling and London. Kipling demonstrated that the S. S. could cover a wide range of time and space effectively.

The flowering of the S. S. in England and America in the late nineteenth century owes much to the magazines and newspapers which provided the S. S. writer with his prin. means of expression. The *Strand Magazine* not only serialised the long works of Conan Doyle, but pub. S. Ss. by Kipling, Barrie, and many others. After the First World War increased costs made magazines of this type gradually fewer. The radio has not yet generally proved to be a valuable medium for the S. S. Such practical difficulties have made it almost impossible for the unknown author to make his name through the S. S. Modern Eng. masters of the S. S. are usually novelists also, as, for example, W. Somerset Maugham. A name made by means of a novel makes possible the pub. of a collection of S. Ss. But in spite of these severe restrictions the S. S. continues to enjoy a certain popularity. Its present varied character defies any rigid definition. Recent trends in Eng. writing, however, suggest that in England it can be defined by something more than its length. The Eng. S. S. has become increasingly disciplined. In Graham Greene's writing the S. S. is given a plot with movement and excitement, and has feeling and a high degree of technical skill. It is based on the traditional narrative S. S., but has taken something from the Tchekov school. It has depth, yet it is supremely readable. Evelyn Waugh also takes the traditional S. S. as his basis, but writes with the polish and detachment of Maupassant. See Sean O'Faolain, *The Short Story*, 1948, and W. Somerset Maugham, *A Writer's Notebook*, 1949.

Shoshonean Language, see under NORTH AMERICAN NATIVE LANGUAGES.

Shoshone Falls, on the Snake R., in Idaho, U.S.A. They drop 210 ft.

Shoshone River, see SNAKE RIVER.

Shoshones, or Snake Indians, div. of the Amer. Indians, living in Wyoming and parts of Utah and Nevada. Some of them have warlike characteristics, while others are comparatively peaceful. Their number has been estimated at 2500.

Shoshong, formerly the cap. of the Bantuanwato, in the protectorate of Bechuanaland. It lies some 214 m. N.N.W. of Pretoria. Since the foundation of Palapye, the new cap., S. has lost its pop. and commerce.

Shostakovich, Dmitri (b. 1906), Russian composer, b. at St. Petersburg. He studied there (Leningrad) under Glazunov, and pub. his first symphony in 1926 and in the next few years wrote the operas *The Nose* (1930), *Katerina Ismailova* (1934),

and *A Lady Macbeth of Mtsensk* (1934), which brought him into Stalin's disfavour and his works were withdrawn. With his fifth symphony, however, he was restored to favour and has since then written sev. others, notably the seventh, entitled *Leningrad*. He has also composed pieces for piano and film music.

Shotgun, see under **RIFLE**.

Shottery, in Warwickshire, England, 1 m. W. of Stratford-on-Avon. The home of Anne Hathaway, wife of Shakespeare, whose cottage may still be seen there.

Shotts: 1. Or **Kirk o' Shotts**, coal-mining centre of N.E. Lanarkshire, Scotland. It is the proposed site of a Scottish television transmitter. Pop. 20,200. 2. A series of salt lakes extending from the gulf of Gabes for some 250 m. to the meridian of Biskra, S. of Tunis and Algeria, in the Sahara, Africa.

Shoulder, region where the arm joins the trunk. The articulation of the humerus or arm-bone with the scapula or shoulder-blade is an example of an enarthrodial or ball-and-socket joint. The scapula (*q.v.*) is a flat, triangular bone with a depression called the glenoid cavity into which the head of the humerus fits. The shallowness of the cavity allows great mobility of the shoulder-joint, but renders it liable to dislocation. A certain amount of protection is afforded by the glenoid ligament, which forms a sort of lip about the cavity, increasing its depth, and the acromion (*q.v.*), a process of the scapula which forms a protective arch overhanging the S. socket.

Shove-halfpenny, modern form of shovel-board. Shovel-board or shove-board is played, now especially on ship's deck, by pushing or shoving disks (once pieces of money) with hand or cue along a board marked with transverse lines, the object being to play the disk so that it rests between each set of lines or in one of a number of squares chalked on the neck. Also once called shove-groat, shuffle-board, and shove-penny. Shove-groat was a favourite game during the sixteenth and seventeenth centuries. A parallelogram was drawn on the middle of a table and divided into numbered compartments. The players then placed in turn a silver groat or smooth halfpenny upon the edge of the table and by a stroke of the palm sent it among the partitions, where it scored according to the number on which it came to rest. According to some the game had its origin in Egypt or elsewhere in the Middle E. as early as the eleventh century and reached England some time after the crusades.

Shovell, Sir Cloudesley, or Clowdisley (c. 1650-1707), Eng. admiral, baptised at Cockthorpe, Norfolk, was apprenticed to a shoemaker* but ran away to sea as cabin-boy to Sir John Narborough, and soon rose in the navy by his frank and lovable disposition no less than his merits. After playing active and gallant parts in the battles off Beachy Head (1690) and La Hogue (1692), he assisted Sir George Rooke in the storming of Gibraltar (1704). His ship was lost with all hands off the Scilly Isles.

Shoveller (*Spatula clypeata*), species of Anatidae (web-footed birds) which has a very wide distribution in all the continents, and is noted for the brilliant coloration of the male. The female is of tawny hue, but her mate is of a dark brown, with bright brown lower surface, green head, white neck, black and white wings, greyish bill, and orange feet.

Showers of Fishes, rain-storms during which quantities of fishes fall from the clouds with the rain. Such a phenomenon, though rare, is susceptible of a natural explanation. The centre of a revolving storm (tornado, waterspout, etc.) exercises a very powerful up-draught, and when passing over a body of water sucks up a quantity, together with any fish, etc., that are contained in it. After being conveyed in the storm until its force is expended the fishes are 'rained' down upon the earth together with the water. Such S. of F. are naturally more frequent in countries where tornadoes are of common occurrence, but sev. have occurred in Great Britain. Recent well authenticated occurrences of S. of F. were a shower of hundreds of sand-eels, each about 3 in. long, near Sunderland in Aug. 1918, reported by Prof. A. Meek in *Nature* (vol. 102, 1918, p. 16); and on July 10 and Aug. 30, 1933, when G. T. Gill reported rains of fishes in the Muzaffarpur dist. in India. These Indian cases were later shown to have occurred in typical north-western weather conditions, when tornadoes are frequent. 'Showers of frogs' have sometimes been recorded, for instance, on the afternoon of June 16, 1939, at Trowbridge, Wiltshire, but these are thought to be due to the first rainfall for a long time bringing out, from cool crannies, thousands of tadpoles which simultaneously underwent metamorphosis.

Shrapnel, type of ammunition, consisting, as originally constructed, of a spherical iron shell containing a large number of bullets, sufficient powder being mixed with the bullets to burst the shell when the fuse ignited the charge. It was at first called spherical case-shot, and was designed to attain a longer range than grape-shot or common case-shot. The bursting charge was of just sufficient strength to open the shell and enable the bullets to be propelled forward in a cone-shaped shower covering a large front. The later kind of S. had its bursting charge in a cylinder in the middle of the elongated projectile used with rifled guns. It was invented in 1784 by Henry S. (1761-1852), an officer of the Royal Artillery, adopted by the Brit. Army in 1803, but not used in action until 1808. S. ammunition was increasingly used throughout the nineteenth century, being valued for the 'searching' effect of overhead bursts against entrenched infantry. In the First World War it provoked the invention of the 'shrapnel helmet.' Early anti-aircraft guns used S. almost exclusively, but by 1939 the fragmentation effect of high-explosive ammunition had so far improved as almost to render S. obsolete, and though the term was still loosely used, mainly by journalists, to signify splinters from high-explosive shells, and

the use of S. proper was mainly confined to anti-personnel mines (q.v.).

Shreveport, city on Red R., 328 m. by rail N.W. of New Orleans, in Louisiana, U.S.A. In 1910 petroleum beds were discovered near by; there are also timber and cotton industries. Pop. 98,200.

Shrew Mole (*Scalops aquaticus*), typical species of a genus of Amer. moles, with a slender and elongated snout, and with the toes of the hind limbs webbed, the tail short, and the dentition slightly different, but otherwise resembling the European mole. Closely allied is the starnose (*Condylura cristata*), a small brownish-black animal, native of N. America, with a similar dentition to that of the European mole, but with a star-like fringe of fleshy tentacles surrounding the nostrils at the tip of the snout.

Shrews, or **Soricidae**, family of small, mouse-like, insectivorous mammals. Three species occur in Britain. The common S. (*Sorex vulgaris*) is about 3 in. long, with a long, supple, pointed snout bearing numerous stiff hairs projecting beyond the lower jaw; its fur is reddish-grey above and greyish beneath. It has glands which secrete a strong, unpleasant odour as a means of defence. It feeds on insects, worms, and often on members of its own kind killed after a fight. The pigmy S. (*S. pygmaeus*) is a rare and beautiful little animal with an iridescent fur. The water S. (*Neomys fodiens*) lives mainly on mollusca, and is essentially aquatic in habit though only slightly modified for such a life; the feet are fringed with stiff hairs which aid in swimming.

Shrewsbury, Earldom of. This earldom is one of the oldest in the Eng. peerage. It was first granted to Roger de Montgomery in 1071. His son, Robert, Bellême (q.v.) or Belesme, forfeited his estates and titles in 1102. The title was revived in 1442 for John, fifth baron Talbot (see SHREWSBURY, JOHN TALBOT, EARL OF), whose descendants still hold the title, which ranks as the premier earldom in the Eng. peerage. The twelfth earl of S. (q.v.) was also the only duke of S.

Shrewsbury, Charles Talbot, twelfth Earl and only Duke of (1660-1718), Eng. statesman, was in favour with Charles II. and James II., but was nevertheless largely instrumental in bringing about the revolution. After the accession of William and Mary he was appointed secretary of state, and in 1694 was made a duke and head of the gov. He was charged with negotiating with the Jacobites, and retired from office and went abroad in 1700. Ten years later, however, he consented to fill the post of lord chamberlain. See his correspondence ed. by W. Coxe, 1821.

Shrewsbury, Earl of, see BELLEME, ROBERT.

Shrewsbury, John Talbot, first Earl of (c. 1388-1453), Eng. soldier, was lieutenant of Ireland 1414-19, and again in 1445. One of the most distinguished warriors of his age, from 1420 onward he fought intermittently in the Fr. wars, defeating the Burgundians at Crotoy (1437), recovering Harfleur (1440) and Bordeaux (1452). He

was killed in a foolhardy effort to raise the siege of Castillon.

Shrewsbury, municipal bor. and co. tn. of Shropshire, on the Severn, 161 m. N.W. of London. The old Welsh name for S. was Amwythig, but it was called Pengwern when it was razed by the Merdians in the eighth century, and later renamed Scrobberhyrig, with alternative Sloppesbury or Slopesburie, whence the modern S. and Salop respectively. The tn. centro stands on a lofty peninsula within a horseshoe bend of the Severn, suburbs beyond the riv. being reached by six bridges. Hilly, crooked thoroughfares and many Georgian and black-and-white timber-framed buildings give the tn. a picturesque dignity; both sides of Butcher Row are lined with sixteenth and seventeenth century half-timbered houses and the balconies of those in Grope Lane jut out so far as almost to meet. Roger, earl of Montgomery, lord of all Shropshire, founded the castle and the abbey. His son, Robert Bellême, rebelled against Henry I.; but he was defeated, and the castle and tn. forfeited to the king. The castle remained as a royal fortress till the time of Charles II., and to-day, standing on high ground, still dominates the tn. and the riv. The tn. was walled by Henry II., but its area then was small. A second wall, enclosing a much extended area, was built by Henry III. Part of this, known as the tn. walls, remains to this day. S.'s position near the Welsh border made it a place of military importance, and in the thirteenth and fourteenth centuries there was seldom any long period without fighting between the Welsh and Eng., and in this border warfare S. always had more than its share.

With the accession of the Tudors, however, came a period of tranquillity and great prosperity, during which well-to-do merchants built themselves the beautiful timber-framed houses which survive to-day. Among the most notable are two rare examples of Tudor architecture: Ireland's mansion (1575), and Owens' Mansion (1592), which faces it across High Street. Rowley's House, a sixteenth-century timber-framed building contain the museum of Rom. antiquities from the Rom.-Brit. city of Uriconium. Near the site of the old High Cross stands St. Mary's church, one of the most beautiful par. churches in England, graced with a Norman nave and Early Eng. aisles and transept, and a tall slender spire. It is notable, too, for the beauty and richness of its stained glass (most of which came from Trier Cathedral) the great 'Jesse' window, erected by Sir John de Charlton, at the E. end being particularly remarkable as Eng. glass dating from about 1315. The abbey of St. Peter and St. Paul was founded as a Benedictine monastery by Earl Roger de Montgomery in 1083. It was a very large estab., the church alone being more than 300 ft. in length, but at the dissolution by Henry VIII. the E. (monastic) half, together with the monks' quarters, was demolished, the W. half being spared as it was used as a par. church.

S. school, founded by Edward VI. in 1551, and removed to a new site beyond the riv. overlooking the tn. in 1882, ranks among the foremost public schools, and lists Sir Philip Sidney, Wycherley, Darwin, Paley, Samuel Butler (1835-1902), and Stanley Weyman amongst its distinguished alumni. It owed its advance largely to the unusual teaching ability of Dr. Butler (1798) and his successor, Kennedy. There is also a high school for girls, founded in 1885. Glass-staining, flax-spinning, malting, iron-founding, and the making of agric. implements are the chief industries. The main heavy industries are located in the N. suburbs along garden-city lines, and therefore do not conflict with the picturesque aspect of the tn. or its approaches. S., with the rural dist. of Aitcham, forms a co. constituency, and returns one member to Parliament. Pop. (estimated 1949) 45,310. See T. Phillips, *History and Antiquities of Shrewsbury*, 1837; H. R. Forrest, *Old Houses of Shrewsbury*, 1920; and A. W. Ward, *Shrewsbury: a Rich Heritage* (primarily a survey of the old houses), 1947.

Shrikes, or **Butcher-birds**, as they are sometimes called, from the way some of them impale small animals, lizards, frogs, and insects on their beaks, constitute the passeriform family *Laniidae*. They have long, sharply clawed feet and hooked beaks. The great grey shrike (*Lanius excubitor*) is a regular winter visitor to Britain; the length is about 10 in. The lesser grey shrike (*L. minor*), 8-9 in. in length, in plumage resembling its larger relation, is an occasional visitor. The red-backed shrike (*L. collurio*) is a well-known summer visitor and is shorter than the great grey shrike. The only other visiting species is *L. pomeranus* or woodchat, a black-backed bird about 7½ in. long.

Shrimp (*Crangon*), genus of crustaceans. The common S. (*C. vulgaris*) is one of the most abundant crustaceans on Brit. coasts frequenting shallows in immense shoals, but also visiting deep water. It is greyish-brown in colour, dotted with dark brown, which gives it a very close resemblance to the sand. It is about 2 in. long, and has a round articulated carapace with two pairs of antennae; the 'tail' or telson is flat, laminated, and hirsute; the eyes are prominent and close together. After boiling the cuticle becomes brown. Large quantities of small prawns, which turn pink on boiling, are sold as S. See W. L. Schmitt, *Mud Shrimps of the Atlantic Coast of North America*, 1935.

Shropshire (A.-S. *Scrobbshyriscire*), or the co. of **Salop**, co. of England on the Welsh border, bounded N. by Cheshire and Flintshire (detached portion), S. by Herefordshire and Worcestershire, E. by Staffordshire, and W. by Denbighshire, Montgomeryshire, and Radnorshire. The name Salop derives from a latinised form of the A.-S. name. In the S. and W. the co. is hilly, the chief groups being the Stiperstones (1731 ft.), the Longmynd plateau (1696 ft.), the Caradoc range, the Wrekin (1335 ft.), Wenlock Edge, and the

Clees (Brown Clee, 1792 ft.). The prin. rivs. are the Severn (formerly much used for navigation) and its trib. the Teme. Near the N.W. border are sev. lakes or meres, of which the largest is Ellesmere (116 ac.). Geologically the co. displays a greater variety of rocks than any other co. in England; it was the scene of classic work by Murchison, Maw, Lapworth, Cobbold, and others. The diversity of geological formation gives rise to great variety of landscape and scenery.

Coal is mined in the Lilleshall-Oaken-gates area, near Chirk, and at Highley. Ironstone deposits are now exhausted, but limestone, roadstone, and a small quantity of building stone are quarried. The once-important lead-mines on the W. slopes of the Stiperstones now yield only barites. The chief industries, besides coal-mining, are iron-founding, brick-making, and agric. and general engineering. Carpets and radio receivers are made at Bridgnorth; clocks at Whitchurch; agric. implements and machinery at Shrewsbury, Wellington, Presc., Market Drayton, Whitchurch, and Ellesmere; structural pre-cast concrete at Dawley. The Coalbrookdale area occupies an important place in the hist. of the iron industry. Here Abraham Darby (c. 1709) first discovered the process of smelting iron with coke; cast-iron rails were first used (1767); the first iron boat was constructed by John Wilkinson and launched on the Severn (1787); the first iron aqueduct was made (1797) and still exists at Longdon-on-Tern; the first iron bridge was erected over the Severn by Abraham Darby III. (1779), and has given its name to the tn. of Ironbridge. The greater part of the co., about four-fifths of its area, is devoted to agriculture. Wheat, oats, and barley are grown, and other important crops are sugar-beet, turnips, swedes, mangolds, and potatoes; some hops are grown in the extreme south. A high proportion of the area is under grass, and cattle and sheep are reared in large numbers. Dairy farming is a flourishing industry, especially in the N., but most of the milk is distributed direct to consumers or sent to factories (of which there are sev. in the co.) for processing; farmhouse butter and cheese-making has greatly declined. The mkt. tns. of Shrewsbury, Oswestry, Ludlow, Bridgnorth, Ellesmere, Whitchurch, Wellington, and Bishop's Castle serve as centres for the agric. dists. Important sheep sales are held at Craven Arms.

On the evidence of its numerous hill-top forts, S. had a considerable pop. in the Early Iron Age. It was settled by the Romans, who estab. at Wroxeter the third largest city of Rom. Britain, and was added to the Saxon kingdom of Mercia by Offa in the eighth century. There are sev. sections of Offa's Dyke, marking the boundary between Mercia and Wales, in the W. of the co. Near Shrewsbury was fought the bat. between Henry IV. and the Percys (1403), when Hotspur lost his life; the place is now marked by the church and vil. of Battlefield. The co. contains many beautiful ruins, such as

Haughmond, Buildwas and Lilleshall Abbeys and Much Wenlock Priory. There were no fewer than thirty-two castles, of which only fragments generally remain; Ludlow is the finest. Stokesay (see HOUSE) is perhaps the best example in the country of a fortified manor-house of the thirteenth century. There are many other fine manor-houses of the sixteenth to eighteenth centuries, and a wealth of traditional timber-framed architecture characteristic of the area. The churches display good Norman work, especially at Heath Chapel, Edstaston, and Holgate;

war in India (1844) and in the Indian mutiny. The 85th (2nd Battalion), raised in 1794 by F.-M. Sir George Nugent, was called 'Bucks Volunteers,' having been recruited largely in Buckinghamshire. The regiment was in the peninsula, and later participated in the battle of Bladensburg and the capture of Washington. Further honours were gained in Afghanistan and S. Africa. These regiments linked in 1881 to form the present regiment. During the First World War thirteen battalions were raised, which served in France, Flanders, Macedonia, and Palestine. In the Second



LUDLOW CASTLE, SHROPSHIRE

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Acton Burnell is a perfect example of Early Eng.; Tong is Perpendicular, with a splendid series of monuments. Area 861,800 ac. Pop. (estimated 1949) 290,300. See R. W. Eyton, *Antiquities of Shropshire* (12 vols.), 1854-60; C. S. Burne, *Shropshire Folk-lore*, 1883; D. H. S. Chanage, *An Architectural Account of the Churches of Shropshire*, 1901-12; J. E. Auden, *Shropshire*, 1926; W. W. Watt, *Shropshire, the Geography of the County*, 1939; H. W.imperley, *Shropshire Hills*, 1947; E. Vale, *Shropshire*, 1947; and B. Waters, *Severn Stream*, 1949.

Shropshire Breed, see under SHEEP.

Shropshire Light Infantry, The King's, formerly the 53rd and 85th Foot. The 53rd (1st Battalion), raised 1755, served in Gibraltar, Canada, and in 1793 under the duke of York in Flanders. Under Wellington it served in the Peninsula war, and went to St. Helena, where it gained great praise from Napoleon as a model regiment. It took part in the Sikh

World War the regiment served as landed infantry in N.W. Europe and Italy, notably in the battle of Normandy, 1944.

Shrove Tuesday, Tuesday before Ash Wednesday, and thus belongs to the days of preparation for Lent. The name refers to the fact that it was the time for shrift or confession before the Easter communion. The pancakes appropriate to the day are almost the sole widespread survival of the merrymakings with which it was once celebrated. Yet in various parts of England some celebrations are still known, e.g. the pancake race at Olney, Buckinghamshire; the tossing of the pancake at Westminster School; the football game at Ashbourne, Derbyshire; the hurling at St. Columb, Cornwall, played with a silver-coated ball; and skipping on the foreshore at Scarborough, Yorkshire. See also MARDI GRAS.

Shrubs, woody perennials in which the primary stem usually grows slowly compared with that of a tree, while the

lateral branches develop more rapidly. The term is, however, somewhat loosely applied. S. are grown in gardens for the ornamental value of their foliage or bloom, or for their massed effect in a shrubbery. This feature of the garden should combine a proportion of both evergreen and deciduous S., so that the whole may be decorative at all seasons of the year. As S. usually occupy a position for a lengthy period, careful preparation of the soil by trenching and by adding leaf soil or peat and decayed manure is advisable. Deciduous S. are best planted in Oct. or Nov., and evergreens either in Sept. or May. Most deciduous S. bloom on the wood made the previous year, and these should be pruned when they have ceased flowering. See L. H. Bailey (ed.), *Cultivated Evergreens*, 1923; W. J. Bean, *Shrubs for Amateurs*, 1924; A. Osborn, *Shrubs for the Garden*, 1933; W. J. Stokes, *Observer's Book of Trees and Shrubs*, 1938.

Shu, one of the 'great company' of Egyptian gods at Heliopolis, son of Rā or Tem. He personified the atmosphere and his 'pillars' supported the heavens. He interposed between Seb, the earth-god, and Nut, wife of Seb, and is figured up, holding the latter's arched body. One version of the myth relates that he had to make use of a ladder to lift Nut's body, and he is mentioned as one of those who helped the deceased to mount the ladder to heaven. He is frequently represented as placing the sun in its correct position between heaven and earth.

Shubenacadie, riv. forming a boundary between Hants and Colchester, in Nova Scotia. It empties into Cobequid Bay.

Shumack, see SUMACH.

Shumalari, see CHAMALHARE.

Shumla, see SHUMEN.

Shunt, in electricity, is a conductor which, in a closed circuit, diverts part of the current. S. coils are often employed in galvanometers to allow only part of the current to pass through them, while they are further extensively used in arc-lamps to maintain the arc, and in dynamos and motors to divide the current as it leaves the brushes so that some of it may be utilised in the field magnets. See ELECTRIC GENERATOR; ELECTRICITY AND MAGNETISM (CURRENT ELECTRICITY); ELECTRIC LAMPS; ELECTRICAL MOTORS.

Shupanga, see CHUPANGA.

Shusha, tn. in the Nagorno-Karabakh Autonomous Region of the Azerbaijan S.S.R., 170 m. S.E. of Tiflis. Carpets, silks, and cotton goods are manufactured. Pop. 17,000.

Shushtar, dist., and a tn. in that dist., in the prov. of Arabistan, Persia. Cereals, limes, opium, and cotton are the staple products of the dist. There are important oilfields of the Anglo-Iranian Oil Company near the tn., which lies on the Karun. Pop. 12,000.

Shute, John, see BARRINGTON, VISCOUNT.

Shuya, tn. of the Ivanovo Region of the U.S.S.R., on the R. Teyz, 70 m. N.N.E. of Vladimir. Cotton-spinning, printing, and dyeing are carried on. Pop. 58,000.

Shwabo, tn. of Upper Burma, and cap. of the S. dist., bounded on the E. by the

Irrawaddy and 42 m. N.N.W. of Mandalay. It was the scene of fighting between Lord Mountbatten's forces and the Jap. in early 1945, before Mandalay was captured by the Brit. Fourteenth Army. Area of dist. 5714 sq. m. Pop. 496,200; pop. of tn. 14,000.

Shwedaung, tn. of Burma, in the Prome dist., 10 m. S.S.W. of Prome, on the Irrawaddy, with a trade in rice and a weaving industry. Pop. 11,000.

Sialkot, tn., 72 m. N.N.E. of Lahore, in the W. Punjab, Pakistan. It is a military cantonment, but the manufs. of paper, 'susi' cloth, cotton tents, and sport outfits are also important. There are also tanneries. Besides a remnant of an anct. fort, there is an historic Sikh shrine. The dist. of S., which is agric., has an area of 1576 sq. m. and a pop. of 1,190,500. Pop. of tn. 138,300.

Siam (Thailand), independent kingdom of the Indo-Chinese peninsula, bounded on the N. by Burma and Laos, on the E. by Laos and Cambodia, south by the gulf of S., and W. by Burma. Lower S. extends down the Malay Peninsula, and is bounded by the gulf of S. on the E., the Brit. Malay States on the south, and the bay of Bengal on the W. The total area of the country is 200,118 sq. m. The peninsula slopes downwards to the ocean from the N.W. and the great mt. ranges of Tibet. The prin. rivs. are the Salween, which for 200 m. forms the boundary of Burma and S.; the Menam with its trib. the Meping, which are Siamese throughout their length; and the Mekong, which forms most of the Laos boundary, and its tribs., which water the E. plains. The country is naturally divided into three regions: the N.W. mountainous dist., the great central plain which slopes down to the sea, and the narrow strip of lower S., which has some lofty mts., and is covered with dense forest. The climate is not extreme; the plains are healthy, enjoying dry, fresh air and cool nights; but in the mountainous dists. the atmosphere is humid and malarial, and very trying to Europeans. The flora resembles that of Burma: mangroves, rattans, and other palms flourish in the coast region; the great fertile plains are covered with rich rice fields and plantations of coco-nut and areca palm; further up in the damp highlands great apple-trees grow by the side of peaches, vines, and raspberries. The teak tree grows freely on the higher ground, and is much valued for its hard timber, which is floated down to Bangkok and exported; S. is the largest teak-producing country in the world. Sev. Brit. companies hold leases for the exploitation of the teak forests of North S. Pineapples, custard-apples, bread-fruit and mango flourish freely. The country is rich in big game.

Productions.—The minerals include gold, silver, rubies, sapphires, tin, copper, iron, and coal. Tin-mining is a flourishing industry, chiefly on the W. coast, especially on Phuket Is. Wolfram is also found. Rubies and sapphires are mined in the Chantabun dist. The forest dept.

is officered by experts from the Indian Forest Service, and forms a valuable industry. Rice is the chief crop, both for internal consumption and for export. Rubber trees have been planted in Lower S. Large tracts of land formerly lying waste are being opened up by irrigation. Rice-mills and saw-mills and a few potteries and distilleries are all S. can boast of in the way of factories. Her commerce with India and China dates back to the beginning of the Christian era. Eighty-five per cent of the trade was with the Brit. Empire before 1939, and incomplete figures available suggested a considerable revival of commerce between S. and Britain from 1946 to 1949. The bulk of the country's trade is carried on through the two great ports of Singapore and Hong Kong, and the revenue in 1948 was estimated at £168,017,579. There are 2100 m. of state-owned railways, including a line connecting Bangkok with Singapore. Railways from the cap. run to Varinar (360 m. N.E.), Chiangmai (460 m. N. of Bangkok), Aranya Prades (160 m. E.), and Padang Besar (6182 m. south), and there are sev. branch lines. There are internal air services and some 5000 m. of telegraph lines.

Government.—The pop. is estimated at 18,147,000; of this the majority are Siamese, and the remainder are Laos, Chinese, Malays, Cambodians, and Burmese. Until 1932 the king was an absolute monarch, but on June 24 of that year a *coup d'état* was carried out and the king was called upon to rule as a constitutional monarch. Under the constitution of 1932 supreme power resides in the nation, and the king, as head of the nation, exercises legislative power by and with the advice of the People's Assembly, and executive power through the State Council. The president and fourteen members of this council are selected from the Assembly, which consists of 156 members, half of whom are elected and half nominated. The State Council is appointed by the king. For purposes of administration S. is divided into seventy provs., each under a commissioner who is responsible to the minister of the interior.

Religion and Education.—Buddhism is the prevailing religion of the country, and there are about 16,500 temples. Education, though now under national control, is mostly given through the temples. Primary education is compulsory and, in the local public and municipal schools, free. There are about 400 gov. schools, over 10,000 local schools under gov. inspection, and some 300 municipal schools. Girls now form some 31 per cent of the scholars. A univ. was opened at Bangkok in 1917. There are few tns. with a pop. of over 10,000 people. Bangkok is the cap. of S. and other important tns. are Chiang-Mai in the N. and Chumpton in the south. The Siamese call their country Muang-Thai, or land of the free.

History.—It is difficult to trace the early hist. of the country, many influences from outside races having altered its civilisation. Little is known of its prehist., and all the more welcome is an

account given by an allied prisoner who was forced by the Jap. to work on the jungle railway (see *Practical Prehistoric Society for 1948*). Hindu remains are scattered all over the country; it is also probable that for centuries S. remained tributary to the Cambodians. In 1350 the city of Ayuthia was estab. as the cap., and Uthong, the king, must be regarded as the first Siamese monarch who ruled all S.; his dynasty lasted for 200 years. The modern hist. of the country begins with the usurpation of the throne by a Chinese general called Phya Tak, who settled himself at his new cap. of Bangkok after defeating the Burmese; he was the founder of modern S. In 1782 he was overthrown by his Prime Minister, who estab. the present dynasty. The intercourse between France and S. began as early as 1680, and later hist. shows S. to form merely the buffer state between Fr. and Brit. possessions in the Far E. Eng. traders were in S. in the early part of the seventeenth century, and later the East India Company attacked some Siamese through jealousy at the employment of Englishmen not in their service, which led to a massacre of Eng. at Mergui in 1687.

In 1855 a treaty was signed in which S. agreed to a Brit. consul in Bangkok, and Englishmen were allowed to own land and new trade facilities were granted. Similar treaties with other powers were arranged. Trouble arose about the Fr. and Brit. boundaries; the Siamese and Fr. fought out their difference of opinion on the ownership of sev. ports on the E. of the R. Mekong; the Siamese were obliged to accede to the demands of the Fr. after ten days' blockade of the chief port. In 1895 negotiations took place between France and Britain concerning their respective frontiers, and in 1907 a further convention was made with France modifying and arranging the extraterritorial rights enjoyed by France and Great Britain. In 1909 a treaty was signed ceding to Great Britain suzerain rights over the southern states N. of Brit. Malaya. The treaty was costly to S., but opened up a market for the trade of Europe. A new commercial treaty was signed in 1925, giving S. jurisdictional and fiscal authority over these states. King Chulalongkorn, who died in 1910, enjoyed a most illustrious reign, and assisted greatly in promoting the welfare of his country; his son who succeeded him was Vajiravudh, or Rama VI. He was succeeded by his brother, Prajadhipok, in 1925, but in 1935 the latter abdicated and ten-year-old Ananda Mahidol was proclaimed king, a council of regency being appointed to act during his minority. S. declared war on Germany and Austria-Hungary in 1917, and became a member of the League of Nations. Hostilities between S. and Fr. Indo-China in 1940-1941 ended by Jap. mediation, which was, of course, in no sense disinterested, Japan's object being to acquire S. herself as a jumping-off ground for the invasion of Burma and of India. Under a treaty of peace, May 6, 1941, Vichy France ceded to S. considerable tracts of ter. in Laos

and Cambodia in return for a financial consideration. The non-aggression pact between S. and Great Britain, ratified at Bangkok on July 2, 1940, was, like that with France of the same year, soon nullified when Japan invaded Malaya. S., as a pawn in Jap. imperialist politics, declared war against Great Britain and the U.S.A. on Jan. 25, 1942. Aided by the Siamese and subsequently by disaffected Burman elements the Jap. invaded Burma. Nearly twelve months later Bangkok was bombed by U.S. planes for the first time (see further under BURMA, SECOND WORLD WAR CAMPAIGNS IN).

Peace was signed on Jan. 1, 1946, between Britain and India on the one part and S. on the other, providing for the return to Britain of the four Malay and two Shan states ceded to S. by Japan in July 1945. Britain and India also undertook to support S.'s candidature for membership of the United Nations. France, too, made peace, but not until nearly a year later. In 1946 S. appealed to the United Nations to lay her case before the Security Council concerning her Indo-Chinese frontier with France. On Nov. 17, 1946, she concluded a treaty with France by which she restored the Indo-Chinese territory lost by the Vichy gov. in 1941 and annulled the convention of Tokyo of May 9, 1941. The young king, Ananda Mahidol, was found murdered in a bedroom at the Baromphuan Palace (June 9, 1946) with a bullet wound in his head. He had spent the war years at Lausanne, where he was educated, and only returned to S. six months before his death or after an absence, save for his coronation, of thirteen years. His younger brother, Phumibol Adulek (b. 1928), succeeded him. The council of regency was overthrown on Nov. 9, 1947, by a military coup d'état led by Pibul Songkram, who became Prime Minister and virtual dictator.

Language and Literature.—The language of the Siamese belongs to the Tai group of Siamo-Chinese family; in S. the prevailing language is Lao, though many of the hill tribes have distinct languages of their own. Siamese in writing is read from left to right, and in MS. there is no space between the words, making it difficult for those who are not experts. The literature of the country consists mainly of mythological and historical legends, many of Indian origin; there are many works on astrology and the casting of horoscopes, on success in love affairs, and on magic; some are of great age. One class of literature worthy of mention is the *Niti*, or old tradition of good counsel, such as *Rules for the Conduct of Kings*; on such works the youth of S. are fed at present. The oldest monument in S. is the inscription of King Ram-Khampheng (1292), an example of Siamese literary style. King Trailok (1448-88) was S.'s greatest poet. See R. le May, *An Asian Arcady*, 1926, and *Siamese Tales*, 1930.

Art and Music.—Siamese art is not generally exceptional but the temple in Lampun and a number of temples in

Bangkok are competent examples, with little variation, of styles of Buddhist architecture frequently found in India. Siamese music is closely allied to that of India and Indonesia; it has a tone-system almost incomprehensible to W. ears. A style of religious dancing of great beauty has been evolved in which the whole body is used to convey expressions ranging from near-stupor to the heights of frenzy.

See Sir John Bowring, *The Kingdom and People of Siam*, 1857; K. Stumpf, *Ton-system und Musik der Siamesen*, 1901; J. G. D. Campbell, *Siam in the Twentieth Century*, 1902; P. Loti, *Siam* (Eng. trans. by W. P. Baines), 1913; K. Dohring, *Buddhistische Tempelanlagen in Siam*, 1920, and *Kunst und Kunstgewerbe in Siam*, 1925; W. A. R. Wood, *A History of Siam*, 1926; R. Wheatcroft, *Siam and Cambodia*, 1928; E. Koverrup, *Friendly Siam*, 1928, and *The Coinage of Siam*, 1933; B. Swarup, *Theory of Indian Music*, 1933; P. L. Rivière, *Siam*, 1937; R. le May, *Concise History of Buddhist Art*, 1938; K. P. Landon, *Siam in Transition*, 1940; V. Thompson, *Thailand: the New Siam*, 1941; L. Vaillot, *Histoire de la danse*, 1942; H. G. Wales, *Ancient Siamese Government and Administration*, 1943; and Sir J. Crosby, *Siam; at The Cross Roads*, 1945.

Siamang, see under GIBBON.

Siamese Cat, short-haired domestic cat, with blue eyes. When born it is almost white, but it changes to cream or pale brown with darker patches.

Siamese Twins, born of Chinese parentage in Siam in 1811. Their breast bones were united by a band of flesh. They married two sisters in America, having made money by self-exhibition, they died in 1874. Other examples of the phenomenon have occurred.

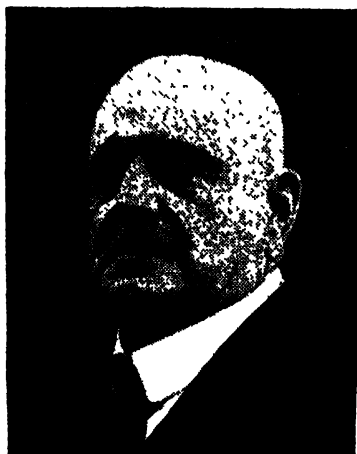
Siam, Gulf of, large gulf lying N. of the South China Sea between the Malay Peninsula and Indo-China, with Siam situated at its N. extremity.

Siam, see HSIANGTU.

Sibelius, Jean (b. 1865), Finnish composer, b. at Tavastehus. When twenty he abandoned law studies at Helsinki Univ. to become a pupil of Martin Wegelius at the conservatoire of music. He studied in Berlin under Albert Becker from 1889 to 1890, and in Vienna with Goldmark and Robert Fuchs from 1890 to 1891. At the age of thirty-two the State made him an ann. grant for life, to free him for composition; much later (1930) the State sponsored gramophone recordings of some of his major works. As the composer of nationalistic music banned in Finland by the tsarist police, S. had his house at Järvenpää searched during the Finnish civil war (Feb. 1918) by Red Guards and, with his family, took refuge in Lappviken Asylum. In the Second World War he lived unmolested at Järvenpää, which for more than ten years he has not left even to visit Helsinki. 'I have cut myself off from politics, they do not concern me.' In earlier days he travelled in both England and America; he is a Mus.Doc. of Oxford (1917).

Only in Scandinavia, Britain, and the

U.S.A. is S. as yet accounted a universal. In Germany and Austria his music is regarded as primarily nationalist. The Fr. came little for it; the Its. next to nothing. S. in his orchestral works (and particularly the seven pub. symphonies) reveals a depth of spiritual intensity and conviction possibly unequalled since the death of Brahms. He himself says that Nature is the book that inspires him. Certainly the brooding vigour of his music evidences exceptional sensitivity to the natural harmonies and rhythms of nature. The stark pines, the discordant winds, the mists rising over the dark lakes, the sound of rain falling among the birch-trees—these, and the superstitions and



Press Portrait Bureau
SIBELIUS.

legends in which Finland is so rich, are the stuff of his musical mind. In Scandinavia it is generally understood that S. regards the tone poem *En Saga* (1892, revised 1901) as a kind of summing up of his philosophy. This highly original work is remarkable alike for wealth of melodic invention and technical ingenuity (there is literally hardly a bar without a pedal point). But to the larger audience S.'s reputation has been built and rests upon the symphonies. Of these, the Second in D major (1902) is widely considered the most structurally interesting, and the Seventh in C (1925), in one great sweeping single movement, the most individual. Perhaps the only work comparable to the latter in integration and logic of growth is the tone-poem *Tapiola*, which followed it. These two works represent the culmination of S.'s evolution towards unity and organic form; in them he expresses a supra-personal view imbued with the deepest serenity through his oneness with nature.

Among the considerable output of miscellaneous orchestral and theatre music,

mention must be made of the *Karelia* overture and suite, the evocative *Swan of Tuonela*, *Pohjola's Daughter*, *Lemminkäinen*, the 'patriotic' *Finlandia*, and *Kuolema* ('Death'), from which comes the famous 'Valse Triste.' The Violin Concerto in D minor (1903, revised 1905), with its mysterious tremolo opening and abrupt changes of mood and texture, deserves to be given a more frequent hearing. As a composer of songs and piano music S. is wanting. One or two of the songs, e.g. *The Trust* and *Autumn Evening*, are superb, but mostly one is left with the impression that the medium was felt inadequate. Likewise, the contribution to the piano consists mainly of agreeable trifles: impromptus, bagatelles, sonatinas, rondinos, various short lyric pieces. And one can explore a not inconsiderable production of chamber music without finding anything to set beside the string quartet *Voices Intimate* (1909). But in the orchestral field the accomplishment of S. so dominates the contemporary scene as to explain, if perhaps it is too early to say justify, the now familiar bracketing of his name with that of Beethoven. See C. Gray, *Sibelius*, 1931; K. Ekman, *Jean Sibelius, His Life and Personality*, 1936; E. Tanzberger, *Die symphonischen Dichtungen von Jean Sibelius*, 1943; Rosa Newmarch, *Jean Sibelius: a Short Story of a Long Friendship*, 1944; and Gerald Abraham (ed.), *Sibelius: a Symposium*, 1947.

Sibenik, port of Dalmatia, Yugoslavia. It has an important textile industry, and is a source of bauxite. Among the important buildings are the cathedral and the sixteenth-century council chamber. Until 1918 it was Austrian ter. Pop. 16,000.

Siberia, area of N. Asia, part of the U.S.S.R., lying between long. 60° E. and 170° W., and lat. 46° N. and 78° N. On the E. are the sea of Japan, the sea of Okhotsk, and the Bering Sea, all opening on to the Pacific. The capes include Cape Chelyuskin or N.E. Cape, in the extreme N., E. Cape on the Bering Strait, and Cape Lopatka on the south of the Kamchatka Peninsula. Besides the above-mentioned seas, other openings are the gulfs of Obi and Yenisei, the gulf of Anadir, and the gulf of Tartary, with many smaller ones. The r. are not very numerous, the prin. being North Land, Wrangel Is., New S. Is., and Sakhalin. To the south are China and the Russian republics of central Asia, to the N. the Arctic Ocean, and to the W. (from N. to south) the Archangel Region, the Komi A.S.S.R., the Kirov Region, the Udmurt A.S.S.R., the Bashkir A.S.S.R., and the Chkalov Region. S. itself comprises the Sverdlovsk, Chelyabinsk, Omsk, Novosibirsk, Sakhalin, Irkutsk, and Chita Regions; the Altai, Krasnoyarsk, and Khabarovsk ters., the Olrot, Jewish, Khakass, and Tuva autonomous Regions, the Yakut A.S.S.R., and the Buryat-Mongolian A.S.S.R., all of the R.S.F.S.R.

Races.—Most of the inhab. of S. are Russians, but other races include the Kirghiz in the S.W., the Kalmyks on the

borders of the Altai Mts., the Tungus to the E. of the Yenisei, the Ostyaks in the N.W., and the Samoyedes on the shores of the Arctic Ocean, besides Yukagirs, Koryaks, Buriats, and Yakuts, etc. The whole ethnological structure of S. is now being systematically studied by Soviet scientists, especially that of the people of the Far N. Titles, like Samoyed ('self-eater' or cannibal), which have long been used, were no more than words of abuse. Hence the native names have been officially restored to the tribes: e.g. the Samoyeds are called Nyentse, the Tungus Eryenki, the Dolgans Sakho, and the Ostyaks Ketl. There are numbers of Cossacks settled in the country. The educational development of the Siberian natives has been undertaken by the Soviet Gov. Special schools have been estab., necessarily on a bilingual basis, since there are some twenty-six tribes, each with its own special language or dialect, none of which had previously been written on any systematic basis. The civilising of the peoples has been a work of some difficulty, particularly as Shamanism (q.v.) still persists, so that disease and other misfortune are regarded as the work of evil spirits. Univs. include those at Tomsk and Irkutsk, and there are colleges at Omsk, Cheka, and Vladivostok.

Physical Features and Climate.—The N. part of S. consists of vast plains or steppes which are known as tundras, becoming, as they approach the Arctic Ocean, more bleak, and destitute of all vegetation. On the south borders of the lowland plain are the Altai, Abakan, W. Sayan, Baikal, and Yablonai Mts., at the lofty Vitim plateau of Transbaikalia; and on the N.W. the Ural Mts. form part of the boundary with the European part of Russia. There are numerous lesser ranges, principally in the south, which is the most mountainous region, and a line of mts. runs from the Bering Strait in a S.W. direction to Transbaikalia; there is a range of volcanic mts. on the Kamchatka peninsula, and there are many lower ranges in central S. Of the numerous rvs. four are of importance, the Ob (or Obi), the Yenisei, the Lena, and the Amur; they are all of immense length, and form the great highways of S., being navigable during the summer months, and available for sledge traffic for the rest of the year. Except the eastward-flowing Amur, all empty into the Arctic Ocean. Lakes, both salt and fresh, are numerous, the largest is Lake Baikal in the south, which has an area greater than any other fresh-water lake in Asia, being 400 m. long, and in some places 50 m. broad.

The climate of S. is intensely cold. In the N. the winter lasts for nearly ten months, and is more severe than in any other part of the world. At Verkhoyansk (67½° N., 134½° E.) in winter the average temp. is -53.1°, falling at times to -84° F., while at Irkutsk, in the south, the temp. in winter is frequently only -51°. During the short summer, vegetation grows remarkably rapidly, and is plentiful in the south.

Flora and Fauna.—In the extreme N.

there is no vegetation, but below about 60° N. lat. there is a vast region of forest land, the trees being chiefly larch and fir and the beautiful stone pine. On the mts. the alpine rose, wild cherry, spirea, and other shrubs flourish, and berries of all kinds are abundant, the raspberry and black and red currants growing beneath the trees in the forests. Hunting is carried on for the purpose of obtaining fur; the sable is the most valuable, as it is now nearly extinct. The animals found in the N. include the reindeer, arctic fox, and wolf; further south the bear, wolverine, ermine, and beaver are found, and numerous others common to Europe and Asia. Game birds and water-fowl are abundant, and the rvs. yield an immense quantity of fish, which is a staple food. The reindeer and the Eskimo dog are both used as draught animals in parts of the country. Seals are hunted on the Okhotsk coast.

Agriculture, Productions, and Industries.—Agriculture is widely carried on, the cultivated area having been increased from 130,000 ac. in 1915 to some 790,000 in 1944. A very complex meteorological service has been developed in the extreme N. Every tn. in the Arctic has its air base, and the aeroplane has provided the impetus to the remarkable development that has taken place in Arctic S. in recent years. Soviet research has achieved much in overcoming seemingly insoluble problems in an ice-bound region. Elaborate insulation has been built into 'subterranean hot-houses' which are, in effect, heat chambers in the bosom of the glacial soil. In these chambers tomatoes, pears, and peaches ripen slowly as in a temperate summer sun. Sugar-beet, flax, and *koksagyz* (producing rubber) are also cultivated. Grain and livestock are produced in the W. areas, and cattle in the Buryat-Mongolian A.S.S.R., where fox and poultry breeding and bee-keeping are also carried on. The E. areas produce soya-beans and have important fisheries. There are apple orchards round Tomsk, and grain is extensively grown in the south. In Khakass are sheep, cattle, barley and oats, and timber; and barley and rye in Yakutsk.

The minerals gold, silver, platinum, lead, iron, and copper are all worked; and some precious and semi-precious stones are found, including emeralds, beryls, and jasper. The prin. gold mines are in the Yakutsk republic, on the R. Olekma, and in the Altai Mts. The Nerchinsk Mts. contain silver mines, lead, and copper. Coal is also found in vast quantities, and salt is mined in Transbaikalia, while salt springs occur in sev. places.

The remarkable industrial development of S. owes much to the foresight of Stalin, who, realising that Russia's industries W. of the Urals were easy targets for invaders, envisaged the union's industrial system as centred in Siberia, and therefore able to give life blood to the U.S.S.R. notwithstanding the ravages of the invader W. of the Urals. In some places, indeed, empty reception factories were built before the Second World War, their

purpose being to house the plant which might have to be transferred from the factories in the Donetz area or elsewhere in European Russia. The tractor works and collective farms estab. in S. were capable of rapid transfer to the needs of war, and Siberian coal, iron, wheat, and many other products played a vital part in Russian survival and victory in the war.

Two of the largest areas of valuable natural resources are the Kuzbas basin and Urals area. Under the Soviet Gov. the Kuzbas basin resumed production after the lapse of seven centuries, for Genghis

lovs (formerly Ekaterinburg) is politically and industrially a new city. Round it are some of the greatest plants in the Soviet Union. Sverdlovsk is not only a great producing centre but is also a metropolis for satellite tns., each engaged in one or other of a group of allied industries. Here too is Asbest, round which tn. are the richest asbestos deposits in the world. At Nizhne-Tagil, where there are steel-rolling mills, the pop. quintupled in the decade 1930-40. In the same period Kamensk-Uralsky's pop. rose tenfold. It is a key centre of all Soviet industry, where



SIBERIA: THE ALTAI HIGHLANDS
An Orat herder on the 12th of October Reserve.

E.N.A

Khan used its iron. This basin of inexhaustible mineral and other resources is part of the Novosibirsk Region. This tn. is one of the products of the first five-year plan. In 1928 cattle roamed the sites of its main streets. By the early 1930's it was already a tn. of 100,000 inhab. Before 1940 the pop. had grown to 500,000. Stalinak, too, has grown phenomenally. Yet other new tns. of the basin are Krasnoyarsk, Kemerovo, and Kutnetz Novosibirsk and the other tns. of the Kuzbas are not merely primary producers, though steel working is an important activity, and there are many foundries and engineering works in the dist. Though the beginnings of Russian industry were in the Urals, the great development of the region is an achievement of the first five-year plan. The Urals are the core of Russia's wealth, and the basis of her industrial position. Yet in a sense Sverd-

lovsk concentrated the non-European output of aluminium. Other tns. of the area are Nizhne-Sergiy, Nizhne-Issetzky, Chelyabinsk and Magnitogorsk (q.v.). Chelyabinsk is notable for its huge tractor factory. There has also been marked development in the area deep in the almost uncharted plains of Asia. For here, too, new tns. have sprung up in a short time, as, for instance, Karaganda, while the older tns., like Samarkand and Chimkent have been changed out of recognition. Formerly they were names for a caravan traveller's notes; to-day they turn out great quantities of wolfram, silk, textiles, copper, coal, and zinc. In 1898 a railway line was opened between the R. Amur and Vladivostok. Construction of the Trans-Siberian Railway (q.v.) from the latter tn. to Moscow was undertaken between 1891 and 1905. Another line, begun in 1905, connected with the first-

mentioned at Khabarovsk, running from Chita. Since the revolution a new line has been constructed from Omsk on the Trans-Siberian Railway through Stallusk to Port Soviet on the gulf of Tartary. Barnaul is linked with Tashkent, in the Uzbek S.S.R., by the Turksib (*q.v.*) line, which was linked to the Trans-Siberian line in 1929.

History.—The earliest inhab. of Siberia were probably the Yeniseians, who were followed by the Ugro-Samoyedes. These in their turn were driven out by Turkish tribes, who were ousted by the Mongols about the thirteenth century. The Tatars from Turkestan were the next to invade the country, but in 1580 the Russian Cossack, Yermak, crossed the Urals and penetrated to Tobolsk. Tradition credits him with handing S. over to Ivan IV., but, however that may be, by 1584 the Cossacks had abandoned the country. Even before the time of Yermak or of Ivan the Terrible the Stroganov family had sent emissaries over the Urals into the Siberian plains to establish a 'province' called Mangaseia, whence they brought back furs, salt, and precious minerals in exchange for domestic utensils or spirits and tobacco. In the competition between tsar and Stroganov for land, the great Lake Baikal was discovered. Yeniseisk was a thriving tn. by 1619. Yakutsk in 1632 became the centre of S. Cossack adventurers reached the Pacific coast. In the meantime Moscow was busy erecting forts in the N., and quickly worked her way southwards, and a fort was erected at Yakutsk in 1637. Then she received a check from the Chinese, and by the treaty of Nerchinsk, 1689, had to give up her project of an advance up the R. Amur. An exploring expedition of a military character was then sent out by Russia (1852), and by this means she succeeded in colonising the dist. round the Amur, and further treaties with China followed, finally ceding the prov. to Russia (1857). In 1860 the treaty of Peking also ceded the Ussuri dists.

Gold prospecting is conspicuous in the story of Siberian conquest. In Peter the Great's reign men were sent to seek more gold. More wars ensued, and more towns and settlements developed. The period of S. that brought the land under Russian rule coincided with the world craving for new discoveries. Many races and nations contributed to the discovery of S. England showed the way when Cabot urged her captains and traders to find a route to the E. through the N. seas. But in 1616 a Russian decree was issued forbidding the navigation of the N.E. Passage through the Kara Sea, and this prohibition set the keynote of Siberian hist. for a long time. In 1648 the Cossack, Deynev, found his way into the Bering Straits before Bering, their reputed discoverer, was even born. It was not until 1868 that Capt. Wiggins made the first crossing of the Kara Sea in an ocean-going craft. The first successful navigation of the whole of the N.E. Passage was made by Nordenskjöld (1878). Amundsen and Vilkitiski repeated his voyage, but the

Russian Gov. was bent on a policy of secrecy, and S. was a land to which foreigners must not penetrate. For some time only trappers forced their way into the *taiga*, the virgin forest to the south of the tundra. But the nineteenth century brought scientific expeditions, which even the tsarist gov. could not thwart. The greatest of these were made in 1854 by Schwartz, Ussoltsov, and Hansten. It was in the middle of the nineteenth century that the project of the Trans-Siberian Railway was conceived. For a time Russia feared foreign exploitation, but eventually, with the aid of convict labour from the Siberian prisons, the undertaking was launched by the Russians. Japan was becoming a world power. Russia had vast frontiers with China and Mongolia to protect. For that reason alone the railway seemed to be Russia's life-line. All attempts at colonisation, even with a more liberal network on foreign immigrants, for long failed, and the reason for this was the evil legend of S. as a prison land. It is said that no one can understand S. without a knowledge of the facts, past and present, of the prison life of S. The nucleus of a colonising pop. was formed of two classes, *i.e.* convicts and political exiles, and their influence may be felt to-day in the new S.

The Russian Revolution did not, for a time, greatly affect S., but in 1918 there were Bolshevik and anti-Bolshevik risings, and a Czechoslovak force, recruited from Austrian prisoners of war in Russia, crossed the country, obtaining control of most of the Trans-Siberian Railway. Allied forces arrived at Vladivostok and travelled W., and a directorate of five was set up at Omsk in Sept. This was soon replaced by the rule of Adm. Kolchak (*q.v.*). Little more than a year later he was utterly defeated by the Red forces, and S. became a Soviet country. The utilisation of forced labour would appear to continue in S. In 1949 copies of a Russian codex were presented to the United Nations; this detailed three types of forced labour, a punishment awarded for 'political correction.' No trial is necessary, and the supply and administration are a concern of the M.V.D. (*q.v.*). The Brit. delegate recorded the belief that more than 10,000,000 people were employed in the camps. Those in S. include establs. at Sverdlovsk and Turinsk, Dalstroi in the E., and Karaganda. Area 3,746,552 sq. m. Pop. 13,936,500.

See W. Gerrard, *Greater Russia*, 1903; J. F. Fraser, *The Real Siberia*, 1901; P. A. Propotkin, *Géographie de la Sibirie*, 1904; R. L. Wright and B. Digby, *Through Siberia*, 1913; F. Nansen, *The Land of the Future*, 1914; M. A. Czaplicka, *Aboriginal Siberia*, 1923; C. G. Channing, *Siberia's Untouched Treasure*, 1921; C. Steber, *La Sibirie*, 1936; E. S. Bates, *Soviet-Asia: Progress and Problems*, 1941; J. Borodin, *Soviet and Tsarist Siberia*, 1943; and J. S. Gregory and D. W. Shave, *The U.S.S.R.*, 1944.

Siberian Inscriptions, or Runes, see ORKHON INSCRIPTIONS.
Sibi, tn. of Baluchistan, Pakistan, 72 m.

S.E. of Quetta. It is a railway junction and has horse fairs. Pop. 8000.

Sibiu (formerly *Hermanstadt*, Hungarian, *Nagyseben*), tn. of Rumania, in a Prov. of the same name, the Rom. *Cibi-num*, the former cap. of Transylvania, and one of the earliest Saxon colonies, lies on the R. Zilba about 370 m. S.E. of Budapest. It is the cap. of the co. of the same name, and the seat of a Protestant Saxon bishop and of a Gk.-Oriental archbishop. Its once very strong fortifications are represented by some fragments of the wall and by a few towers near the theatre, whilst the original character of the tn. is preserved in the crooked streets with connecting tunnels. The Bruckenthal Palace, built by the governor of Transylvania (1777-87), contains a picture gallery, a library of 100,000 vols., a collection of engravings, a cabinet of minerals, and an archaeological collection; a museum of popular art has been estab. There is also the Protestant church (fourteenth to sixteenth centuries), the tn. hall, which contains the archives of the Saxon nation, and the Gk.-Oriental cathedral, built 1906. The chief industries are the making of cloth, tanning, wax bleaching, and the manuf. of paper, candles, sugar, and hats. As a result of the treaties of peace, 1919, Rumania was enlarged, and Hermanstadt became a Rumanian possession, its name being changed to S. The Teutonic pop. still preserves some of its anct. customs, and has not yet been entirely merged with the surrounding Rumanian peoples; the races are still physically distinguishable. Pop. (tn.) 50,200; (prov.) 193,300.

Sibsagar, tn. of Assam, India, cap. of the tea-growing dist. of that name, 40 m. S.S.W. of Dibrugarh, on the R. Dihku. Pop. (dist.) 910,000; (tn.) 9000.

Sibthorp, John (1758-96), Eng. botanist, b. at Oxford; succeeded his father as prof. of botany in Oxford (1781), and before his early death made two journeys to Greece. *Flora Oxoniensis* (1794) was his independent work, whilst *Flora Græca* (1806-1840) was based on his collection of 3000 species.

Sibthorpia, genus of trailing plants (family Scrophulariaceæ), named after Dr. Humphrey Sibthorp (1713-97), father of John Sibthorp. *S. europæa*, the Cornish moneywort, the only Brit. species, is an elegant little plant with small, round, notched leaves and minute pale pink and yellow flowers. This and other species are commonly grown in greenhouses and dwelling-rooms.

Sibyl, in anct. mythology, the name given to certain votaresses or priestesses of Apollo, who prophesied when under the inspiration of that deity. The derivation of the word is uncertain; that from *Σιο* and *βουλλα*, the Doric of *θεου βουλή* ('will of God'), being very generally accepted. The most famous is the Cumæan S., who guided Æneas to the lower regions (see Virgil, *Æneid*, book vi.). She sold three Sibylline books to King Tarquin, offering him first nine books, then six, and last of all three for the same price. He paid the price for the three books which he had considered too dear for nine. These books

were preserved in the temple of Jupiter on the Capitol, which was burnt down in 83 B.C. The extant Sibylline oracles comprise some 4000 hexameters, and are Christian and Jewish prophecies. Mentioned in the *Dies Irae*, they were regarded with much reverence in medieval times. See H. Diels, *Sibyllinische Blätter*, 1890, and *The Sibylline Oracles* (trans. by M. S. Terry), 1890.

Sioania, see SICILY.

Sicard, Roche-Ambroise Cucurron (1742-1822), Fr. abbé and educationist, b. at Le Fousseret, Haute-Garonne. In 1786 he was appointed principal of a school of deaf-mutes at Bordeaux, afterwards succeeding the Abbé de l'Épée in a similar post in Paris (1789). He became a member of the Institute in 1795.

Sicani (Sikans) and **Siceli**, see under SICILY.

Sicilian Vespers, see under SICILY.

Sicilies, Kingdom of the Two, see under SICILY.

Sicily, largest, most beautiful, and most populous is. in the Mediterranean Sea, is situated between lat. 36° 38' to 38° 18' N., and between long. 12° 25' to 15° 40' E. It is separated from the mainland of Italy by the narrow strait of Messina, now generally identified as the lair of the legendary monsters, Scylla and Charybdis. In anct. times it was called successively Trinacria (from its triangular shape), Sioania, and Sicellia. The length of the base is 145 m.; of the N. side, 215 m.; of the E., 190 m. The area of the is. is 9926 sq. m. Pop. 4,407,000.

Geography, Climate, Industries, etc.—The is. is mountainous in the N. and centre, the chief ranges being the Peloric range in the extreme N.E., the Nebrodi Mts., and the Madonian range. Etna, an active volcano which in the past has done great damage, is the highest point (10,755 ft.). It is a single mt. lying near the E. coast, just south of the Nebrodi Mts., and is separated by a wide, low plain from the tableland of the S.E. Along the south coast, and in the W., are other fertile plains. The largest rivers are the Simeto, Cantara, Platani, and Salso; all are short and rapid, and frequently dry up in the droughts of summer. The chief mineral wealth of S. lies in its sulphur beds in the central and N. parts of the is.; rock salt and asphalt are also obtained. The soil is generally fertile, the decomposed lava acting as a good fertilising agent. Corn, maize, flax, hemp, cotton, and sugar are grown, and in addition a great quantity of fruit, such as oranges, lemons, figs, pistachios, pomegranates, dates, grapes, olives, etc. The fisheries are valuable, producing sardines, tunny, coral, and sponges. The climate of S. is very warm, but healthy. The heat is particularly intense in summer when the sirocco blows. Torrential rain is common in the autumn, and earthquakes are not infrequent. In 1693 an earthquake destroyed all the southern cities of S.

History.—The peculiar position of S. in the Mediterranean and its natural advantages have caused many struggles for its possession. According to the Homeric

legend, it was inhabited in mythical times by herds of oxen sacred to Apollo. The first historical inhab. were a people of unknown origin, the Sicani, followed by the Sicels, who came over from Italy. Signs of Cretan and Mycenaean influence have been discovered. Gk. and Phoenician colonies were estab. in S. in the eighth century B.C. at Naxos and elsewhere. S. thus became divided into sev. states and independent cities, of which Agrigenton and Gela were the most powerful. The tyrant Gelon, about 500 B.C., transferred his gov. to Syracuse, which became for the time the most important Gk. city in S. The Carthaginians unsuccessfully invaded the is. in 480 B.C., and in 115 B.C. the Athenians made sev. determined attempts on Syracuse, but so strong was

the decay of the Rom. Empire. But the Saracens in turn were driven out by the Normans under Robert and Roger Guiscard, who ruled in the is. from 1072 to 1194. After 1191 the is. passed under the domination of the Ger. emperors. At the court of Frederick II. (crowned at Palermo in 1198), a gigantic political figure and a poet in his own right, a new school of poetry was born, using the It. language proper for the first time, and exercising great influence on the formation of It. language and literature. At Easter 1282, at the hour of vespers, a popular revolution broke out against Charles I. of Anjou, king of Naples, and his Fr. troops; this revolution, known as the 'Sicilian Vespers,' celebrated in many plays as well as in the opera by Verdi, is



THE THEATRE AT TAORMINA, SICILY

the city that their force was utterly defeated. A few years later the Carthaginians again invaded S. and made settlements at Panormus, Motya, and Soloeis. Wars between the Gks. and the Carthaginians followed, with alternating success. In 383 B.C. a peace was made between the rivals whereby the Gk. tyrant Dionysius was accorded possession of the E. and the Carthaginians of the W. portion of the is. Many other struggles between Gk. and Carthaginian and between Gk. and Gk. occurred, but the fate of the is. was not again seriously and vitally contested until the Romans began to challenge the power of Carthage. In 216 B.C., after the first Punic war, S. became a Rom. prov., and thenceforward for some years shared the fortunes of Rome itself, becoming a valuable Rom. granary. The emperor Augustus visited S. towards the end of the civil wars and estab. some colonies. In A.D. 440 the is. was conquered by the Goths, who had overrun Italy. In 535 Belisarius took possession of it, and annexed it to the Byzantine Empire. A Saracen invasion in 827 followed, and by 878 the Saracens became possessors of the entire is. S. flourished during the Muslim rule, recovering from the effects of

still regarded as a symbolic event in It. hist. A republic was proclaimed, and the is. asked for the intervention of Peter of Aragon. S. was attached in 1130 to the republic of Naples, the two together becoming the kingdom of the Two Sicilies; then it passed to the crown of Aragon; and, on the union of Castile and Aragon, to Spain. After remaining the property of the House of Austria and the Sp. Bourbons successively (with the interlude of a brief period of Fr. rule, 1806-15), the is., captured by Garibaldi, was annexed to United Italy on the accession of King Victor Emmanuel in 1860.

In the Second World War the Allies landed in S. on July 10, 1943, the Anzacs attacking the E. end of the southern coast and the Brit. and Canadians the southern end of the E. Syracuse was captured on July 11, Catania on Aug. 5, and Messina on Aug. 17. See further under ITALIAN FRONT, SECOND WORLD WAR, CAMPAIGNS ON, *The Battle of Sicily* (July-August, 1943).

The is. has often been infested with brigands; even in 1949 a Sicilian bandit, Giuliano, was able to defy the most concentrated efforts of police and army authorities to capture him, and, using

modern guerilla tactics, to control large tracts of the is. Mafia (q.v.) is peculiar to S.

Religion, Education, Government.—With the exception of some 100,000 Gks. and a few Jews, the inhab. of the is. are all Itom. Catholics. There are univs. at Palermo, Catania, and Messina. S. before the Second World War was divided for purposes of government into nine provs. or prefectures, viz. Palermo, Messina, Catania, Caltanissetta, Girgenti, Enna, Ragusa, Syracuse, and Trapani. There is a superior prefect who is the supreme civil authority in the is., which of course sends representatives to the It. Parliament. In May 1946 the is. was granted a statute giving it regional autonomy within the political unity and constitutional laws of the It. state. Under this statute, the new Sicilian Assembly received wide legislative powers in such matters as industry and commerce, agriculture, land reclamation, mining, and fisheries, and may also make laws on communications, health, education, banking, labour, and food. The region may also levy taxes and launch loans. Palermo is the cap., Catania and Messina the chief ports; other important tns. are Girgenti, Syracuse, Marsala, Alcamo, and Trapani.

Art.—S.'s art has been moulded by the peoples who invaded her. There are substantial Gk. ruins at Selinunte, and the Gk. theatre at Syracuse, hewn out of the solid rock, is one of the finest in the world. Gk. plays are still performed there occasionally. At Taormina there are a number of Rom. remains, including that of a Rom. theatre. But the most beautiful examples of Sicilian art belong to the era of Norman domination. In buildings to be seen at Palermo, Monreale, Catania, and Trapani the Norman style is perfectly blended with styles showing Byzantine and Saracen influence. At Palermo there is a fine twelfth-century Norman cathedral, and a few miles away are the cathedral and cloisters of Monreale, built in 1174, possessing some of the most beautiful glass mosaics in the world. These mosaics are now said to be the product of a Byzantine atelier of the late twelfth century. Many now unimportant tns. have remains of Norman or Saracen castles. Antonello of Messina and Pietro Novelli de Monreale were both natives of S. There are some good examples of It. baroque at Palermo. Sicilian art suffered little damage during the Second World War.

See E. A. Freeman, *History of Sicily from the Earliest Times*, 1891, and *Sicily, Phœnician, Greek and Roman*, 1892; D. Sladen, *In Sicily*, 1901; G. M. Trevelyan, *Gorbals and the Thousand*, 1909; M. Maeterlinck, *En Sicile et en Calabre*, 1927; A. Brown, *Sicily Past and Present* 1928; F. Moll, *L'Arte in Sicilia, dal sec. XII. alla sec. XIX.*, 1929; A. Sansone, *La Sicilia, 1849-60*, 1930; L. Natoli, *Storia della Sicilia*, 1935; F. Schillmann, *Sizilantische Geschichte und Kultur*, 1935; G. Agnello, *L'Architettura in Sicilia*, 1935; F. M. Guescio, *Sicily*, 1938; R. G. König, *Sicily*, 1943; O. Demus, *The Mosaics of Norman Sicily*, 1950.

Sicinius Dentatus, Lucius, see DENTATUS. **Sickert, Walter Richard** (1860-1942), naturalised Eng. painter and etcher. b. at Munich, eldest son of Oswald Adalbert S., a Dan. painter. He studied under Whistler at Chelsea, and was also a pupil of Degas. He was an actor before following the family tradition. It was not until he was over sixty that his merit as an artist was recognised in England, although he was well known on the Continent. In his work he was an individualist, and in his outlook a rebel against convention. S. was one of the first Brit. painters to appreciate the significance of Impressionism. In all his paintings he sought light, colour, and tone more than anything else. His sources were mostly the theatre, music-halls, and the more intimate aspects of domestic life. Among his earlier works are a number of portraits, including the 'George Moore' (Tate Gallery), 'Charles Bradlaugh at the Bar of the House of Commons' (Manchester), and 'Miss Hilda Sping as Imogen Parrot in *Trilby* of the Wells'. An A.R.A. In 1921, S. was president of the Royal Society of Brit. Artists for a short time after 1928. Other of S.'s works include 'The Camden Town Murder' (1906); 'Sinn Fein' (1915); 'Tulitney Bridge' (1918); examples are to be found in the Brit. Museum, Tate Gallery, Bibliothèque Nationale, Luxembourg, and art galleries of Manchester and Johannesburg. See lives and studies by R. Emmons, 1941, and L. Browne, 1944; G. Johnson, *English Painting*, 1932; and Sir O. Sitwell (ed.), *A Free House*, 1947 (life, with Sickert's own writings).

Sickingen, Franz von (1481-1523), Ger. knight. b. at Ebernburg, near Worms. He took part in sev. wars and became a popular hero. For assisting to secure the election of Charles V. in 1519 he was made imperial chamberlain and chancellor. On Oct. 22, 1522, the council of regency placed him once more under the ban of the empire. With the help of the Swabian League, the rulers of Trier, Hesse, and the Palatinate marched on his castle near Kaiserlautern, and forced S. to capitulate after a short siege, in which he was mortally wounded. See K. H. Rendenbach, *Die Fehde Sickingens gegen Trier*, 1933.

Sickness and Unemployment Benefit, see under NATIONAL INSURANCE ACT (1946).

Sicuani, tn. of Peru, S. America, standing 11,650 ft. above sea level on the railway from Cuzco to Juliaca (120 m.). It is the centre of an agric. and pastoral dist. Pop. 15,000.

Siculan Dialect, see under LATIN LANGUAGE AND LITERATURE.

Sicyon, or Seeyon, anc. city of Greece, situated 2 m. south of the Corinthian Gulf, on the W. bank of the Asopos, in N. Peloponnesus, Greece. It was famous as a centre of wood-carving, bronze work, painting, and sculpture, and it numbered among its famous citizens the painters Eupompus, Apelles, and Pamphilus, the sculptor Lysippus, and the general Aratus.

Sidcup, urb. dist. of Kent, England, 13 m. S.E. of London. Pop. 12,360.

Siddhartha, see under BUDDHA AND BUDDHISM.

Siddons, Mrs. Sarah (1755-1831), Eng. actress, *b.* at Brecon, Wales, the daughter of Roger Kemble; married the actor, Wm. S., when eighteen years of age. Garrick engaged her in 1775 to play at Drury Lane as Portia, but she was not successful in this and other parts. She did not return to the metropolis until 1782, when, her improvement being marked, she drew the t.n., and was a favourite with the public until her retirement in 1812. In tragic roles such as Lady Macbeth she was at her best, her dignified presence and splendid voice being especially suited to those parts. A plaque commemorating her association with Cheltenham was unveiled in July 1919 at an hotel in Pittville Street, on the same site as a converted stable in which she appeared, with a troupe of strolling players, before her performances were brought to the notice of David Garrick. There are portraits of her by Gainsborough, Reynolds ('The Tragic Muse'), and many others, and a statue by Chantrey, in Westminster Abbey. See lives by J. Boaden, 1827; T. Campbell, 1834; P. Fitzgerald, 1871; O. Knapp, 1904; Catherine Paterson, 1909; Naomi Royde-Smith, 1933; and Y. French, 1936; also J. Boaden (ed.), *Memoirs* (new ed.), 1893.

Sidebone, see HORSE (DISEASES).

Sidereal Time, see TIME AND TIME MEASUREMENT, also DAY AND YEAR.

Siderite, or Chalybite, ferrous carbonate crystallising in the hexagonal system and forming rhombohedral crystals (sp. gr. 3.8; hardness 4). It also occurs massive and granular, varying in colour from a pale yellow and grey to dark brown. Heated in the blowpipe it becomes magnetic. As an iron ore it is mined in Cornwall and Cumberland (Cleveland Ironstone), Spain, U.S.A., Carinthia, and Saxony, and is found in the Mesozoic ores of the Eng. Midlands and in the Alsace-Lorraine minette ores. It is also known as spathic iron ore.

Siderokastron (formerly **Demir Hissar**), tn. of Greece, situated on the Kara Soo, 12 m. N.N.W. of Seres.

Siderostat, **Heliostat**, instruments of varying design, the common principle being a plane mirror or mirrors rotated by clockwork at such a speed that the image of a star or the sun can be observed continuously in a fixed telescope. See also COELOSTAT.

Sidesmen, Anglican church officers selected by the curate of a benefice and his churchwardens, whose duty it is to assist the churchwardens in their various duties. In early times they took an oath to present all heretics before the eccles. courts.

Sidotes, see ANTICHRIST.

Sidgwick, Alfred (1850-1943), Brit. logician, *b.* at Skipton, Yorkshire, son of Henry S. (q.v.), and educated at Rugby and Lincoln College, Oxford. For some time he was connected with Owen's College, Manchester, and in 1882 he was elected a fellow of the old Victorian Univ. His works, mostly concerned with formal

logic, include *Fallacies* (1883); *Distinction and the Criticism of Belief* (1892); *The Process of Argument* (1893); *The Use of Words in Reasoning* (1901); *The Application of Logic* (1910); and *Elementary Logic* (1914). An original thinker, he had a part in the revival of the theory of Protagoras that doubt is the stimulus to thought and that genuine thinking is a problem-solving occupation. S. married Miss Cecily Ullman, a novelist, who became known to the reading public first as Mrs. Andrew Dean and then as Mrs. Alfred S.

Sidgwick, Henry (1838-1900), Eng. philosopher, *b.* at Skipton in Yorkshire, educated at Rugby and at Trinity College, Cambridge, where he greatly distinguished himself. At the Univ. he joined the 'Apostles,' so many of whom later became famous. He occupied many academic posts, being lecturer in moral philosophy in 1869, in which year he resigned his fellowship for conscientious reasons. He was in 1883 elected Knightsbridge prof. His prin. writings, which show the influence upon him of the works of John Stuart Mill, are *The Ethics of Conformity and Subscription* (1871); *Outlines of the History of Ethics* (1879); *The Principles of Political Economy* (1883); and *The Elements of Politics* (1891). In addition to the foregoing, which were issued during his life, sev. vols. were pub. after his death containing his lectures, etc., among which are *Ethics of Green, Spencer, and Marlineau* (1902); *Miscellaneous Essays* (1904); and *The Philosophy of Kant and other Lectures and Essays* (1905). See life by Arthur S. and Mrs. Eleanor Mildred S. (his wife and the sister of Earl Balfour), 1906.

Sidi Barrani, small port of Egypt which figured prominently in the battles of the W. desert in 1940 and thereafter. The It. entered S. B. on Sept. 21, 1940, but the Brit. retook it in Dec. Rommel recaptured it in his advance on Egypt in 1942, but the Brit. Eighth Army under Montgomery recaptured it on Nov. 10. See also AFRICA, NORTH, SECOND WORLD WAR, CAMPAIGNS IN.

Sidi-bel-Abbes, tn. in the dept. of Oran, and 48 m. by rail S. of the tn. of Oran, Algeria; it occupies a most important strategical position, and trades in wheat, tobacco, and alfalfa. It is the headquarters of the Foreign Legion. Pop. 65,500.

Sidi Omar, military post 30 m. S.W. of Sollum, on the Egyptian-Libyan border, which figured prominently in the battles of the W. Desert. On Dec. 16, 1940, S. O. fell to Brit. forces, was taken during Rommel's 1941 spring advance, and recaptured in the second Brit. drive into Libya. In 1942 it was abandoned during the Brit. retreat, but finally occupied, on Nov. 11, by the Eighth Army after the Alameln victory.

Sidi Rezagh, vil. of Libya, 10 m. S.E. of Tobruk. On Jan. 6, 1941, Brit. forces took it from the It., the latter, with the Gers., retook it in April, but lost it on Nov. 19; heavy and confused tank battles took place in the neighbourhood of S. R., the Brit. retaining possession. In June

1942 S. R. was abandoned during the Eighth Army withdrawal, to be retaken on Nov. 12, after the Alamain victory.

Sidky, Ismail, Pasha (1875-1950), Egyptian statesman. Educated at the Collège des Frères, Cairo, and at the Khedival Law School. A promising legal career was opening before him when he abandoned law for politics. In 1914, after a short term as secretary to the Ministry of the Interior, he became, for a few months, minister of agriculture, and, for five years, minister of the Waqfs, or religious institutions. Before the First World War was over he became president of the Industrial and Commercial Commission, and he also joined Zaghlul Pasha and the Wafd in the struggle for full independence. This dual decision marked a decisive turning point in his life; hard political realism and personal ambition were now his guiding star, and his true career had only now begun. With Zaghlul and others, he was deported by the Brit. to Malta, but released at Allenby's insistence in April 1919. Already, however, S. had doubts about the Wafd, and, having broken with Zaghlul, he established himself in finance and commerce, and, with the Brit., soon became the Wafd's most formidable enemy. In 1924 he was appointed minister of the interior, and in 1930, as Prime Minister, suppressed the Wafdist press, and proclaimed a new constitution. He held ruthless sway for three years, but in Jan. 1933 he collapsed with congestion of the brain and partial paralysis. After his recovery, in 1936, he joined the national delegation which negotiated the Anglo-Egyptian treaty with the Brit. A year later, after serving for a time in an anti-Wafd Cabinet, he left politics once more and became a director of the Suez Canal Commission. Like other educated Egyptians of his generation S. felt superior to the modern civilization of Europe. He opposed every suggestion that Egypt should declare war on the Axis and, in the war period, shed the last remnants of his reputation as a Brit. puppet. His recall to office in Feb. 1946 came as a general surprise; it was due not so much to his reputation as a strong man as to the absence of any efficient alternative. He tried to get Nahas Pasha, the Wafdist leader, to collaborate in negotiations with the Brit., but Nahas demanded the chairmanship of the negotiating committee and a Wafdist majority. S. refused, and thus, virtually alone, he became the voice of Egypt, enjoying the young king's support, if a strictly limited support. Probably the least popular of all Egypt's chief politicians, his character and outlook were never moulded by the vociferous nationalism of the age, for he grew up in the atmosphere of the auct. and traditional E.

Sidlaw Hills, Scotland, extend from Kinnow Hill, near Perth, in a N.E. direction, to the North Sea at Red Head in Angus, and to Stonehaven in Kincardineshire. The highest points are Craigowl Hill (1493 ft.), King's Seat (1235 ft.), and the famous Dunsinane.

Sidmouth, Henry Addington, Viscount (1757-1844), Eng. politician, b. in London. He abandoned a career at the Bar for politics, and entered Parliament in 1784. He was appointed Speaker (1789-1801), and on the retirement of Pitt became Premier (1801). S. was an incapable Premier, and his ministry came to an end in 1804, when he was created Viscount S., though he subsequently held lesser posts. See life and correspondence by G. Pellett, 1847.

Sidmouth, seaside resort of Devon, England, on Lyme Bay, at the mouth of the Sid, 13 m. E.S.E. of Exeter. Pop. 11,200.

Sidney, Algernon (1622-83), son of Robert S., second earl of Leicester, and grand-nephew of Sir Philip S., was b. at Penshurst, in Kent, entered the parl. army, and fought against Charles I. at Marston Moor, where he was wounded. He held sev. parl. posts. After the Restoration he went abroad, returning to England in 1677. He was tried for treason for his part in the 'Rye House' Plot in Nov. 1683 before Jeffreys, and was executed. His *Discourses Concerning Government* was pub. in 1698. See lives by G. W. Mendley, 1813, and A. C. Ewald, 1873.

Sidney, Sir Philip (1554-86), Eng. soldier and poet, b. at Penshurst, Kent, was in his early years much abroad, and met many of the most distinguished foreigners of the day. In 1577 he was entrusted with a diplomatic mission, and became a favourite with Queen Elizabeth, but incurred her displeasure owing to his support of measure distasteful to her. He wished to join Drake's expedition in 1585, but was appointed governor of Flushing. He served as a volunteer under Prince Maurice at Axel, and at Zutphen received a wound from which he died. He was a friend of Edmund Spenser, who dedicated to him his *Shepherd's Calendar*. None of S.'s works was pub. during his lifetime. He is best known by *Arcadia* (1590), by his sonnets, *Astrophel and Stella*, addressed to Penelope Rich (q.v.), and by *The Defence of Poetrie* (1595; ed. by G. E. Woodberry, 1908), the first example of literary criticism in England. See lives by F. Greville, 1652; H. R. Fox Bourne, 1862; M. W. Wallace, 1913; C. H. Warren, 1936; and A. H. Bill, 1938. See also W. W. Greg, *Pastoral Poetry and Pastoral Drama*, 1906.

Sidney Sussex College, Cambridge, founded in 1596 on the site of a monastery of Grey Friars under the will of Lady Frances Sidney, countess dowager of Sussex. The chapel and library were rebuilt in 1780. The library includes a notable collection of theological works, and possesses a fine collection of mathematical and scientific works known as the Taylor Library. There is a master, eighteen fellows, twenty-seven scholars, and lectureships in mathematics and natural science (founded by Samuel Taylor). Among its eminent members have been Oliver Cromwell, Archbishop Bramhall, and Sir Roger L'Estrange.

Sidon (modern Arabic *Saida*), chief city

of anct. Phœnicia, on the coast of Syria, 25 m. south of Beirut. In the earliest times S. was the leading city of the Phœnicians, whence the latter's alternative name, 'Sidonians' (Deut. iii. 9). It was celebrated for its glass, purple dye, and wines, and other activities were ornamental metal-working and the weaving of fabrics. The famous dye known as 'Tyrian purple,' and the fabrics dyed with it, were in great demand, and contributed greatly to the city's prosperity. Possibly to S. may be attributed the foundation of the colonies of Aradus, Carthage, Melitus, Citium, and Berytus. S. is first mentioned in the Tel el-Amarna tablets (q.v.) for the joint resistance of her prince Zimrida and the Amorites to the attempt of Egypt to conquer the seaboard. Centuries later, when Palestine was conquered, S. was still the leading city of Phœnicia. How long the city held this position is unknown, but in Solomon's age the leadership seems to have passed to Tyre, and in later hist. the relative position of the two cities frequently changed. The Assyrians profited by their rivalry to play off one against the other. S. became a satellite of the Assyrian monarchs, one of whom, Esarhaddon, in subduing a revolt, utterly destroyed the city and built a new city on another site, calling it by his own name, *Is-esarhaddon*, but the name S. persists to this day. During the earlier part of the period of Persian dominion amicable relations existed between the Phœnicians and their masters, but under the lead of S. an attempt was made (c. 351) to throw off the Persian yoke. This ended in tragic failure. Tennes, king of S., in desperation betrayed the city to Artaxerxes Ochus, who perpetrated such gross cruelties in quelling the revolt that, rather than fall into his hands, the people of S. set fire to the city, over 40,000 perishing in the flames. Tennes gained nothing by his infamy, for he was soon butchered by order of Ochus. S. was rebuilt, and maintained a prosperous existence until, with the advent of Alexander, the long maritime ascendancy of the Phœnicians passed away. S., however, continued to be an important trading centre, now under Syrian, and again under Egyptian, authority. The Romans made it a free city. Hardly less chequered was its later hist. It suffered heavily during the crusades, but it once more experienced prosperity under the Druze prince, Fakir ed-Din (1595-1634), and again under Mohammed 'Ali (1832-49). There are abundant evidences of S.'s anct. greatness: the squared blocks used in building the harbour, the rock-cut reservoirs, the traces of walls, columns, etc. In 1885 was found the sarcophagus of King Eshmunazar (c. 350 B.C.); in 1887 many highly ornamented Phœnician and Gk. sarcophagi, among them that of Tabnit, father of Eshmunazar, and the so-called coffin of Alexander the Great. (For biblical references in addition to those noted above, see Gen. x. 19; Matt. xi. 22; and Acts xxvii. 3.) Modern Saidā is a tn. of some 30,000 inhab., mainly engaged in fishing (the name denotes 'prey taken in fishing').

The gardens and orange groves are extensive, and furnish occupation for many. Oranges and lemons are the main export.

Siebscheiberge, or **The Seven Hills**, cluster of hills on the Rhine, 6 m. above Bonn. The best-known peak is the *Drachenfels* (1067 ft.), surmounted by a ruined castle; the highest is the *Ölberg* (1522 ft.).

Siedlce, tn. of Lublin prov., Poland. It lies 56 m. E. of Warsaw, is the centre of a cattle-breeding and agric. dist., and is the seat of a Rom. Catholic bishop. S. was the scene of bitter fighting in the summer of 1944, when the Russians recaptured it from the Gers. Pop. 31,000.

Siegbahn, Karl Manne Georg (b. 1886), Swedish physicist, prof. at Upsala Univ., b. at Örebro; famous for accurate measurements in connection with X-rays, for which work he received a Nobel prize in 1924. He wrote *Spectroscopy of X-rays* (1925).

Siegburg, tn. in N. Rhine-Westphalia, Germany, 16 m. S.E. of Cologne, on the Sieg R. St. Servatius church was founded in the twelfth century, and the Benedictine abbey (which now contains the archives of the Land N. Rhine-Westphalia) in the eleventh. There are dyeing, lacquering, textile, and machinery industries, and steel-works and rolling-mills. Pop. 25,800.

Siege (O.F. *sege*, siege; modern *siège*, seat; from *sedere*, to sit; cf. classical Lat., *obsidium*, a siege), the 'sitting down' of an army or military force before a fortified place for the purpose of taking it either by direct military operations, or by starving it into submission. The science of S. warfare reached its most complicated development in the seventeenth and eighteenth centuries. Fortresses were first blockaded, so as to cut off all intercourse from without, the besieging force encamping just beyond reach of the enemy's guns. Detached works, if any, had to be captured before the opening of the trenches began. These were laid out in a zigzag form, the prolongations of which were directed so as to clear the works of the fronts attacked; and when a direct advance became necessary, they were provided with traverses at short intervals, or blind saps were used, i.e. trenches covered in with timber and earth. These, when two or three of such lines of approach were used, were termed parallels, and it was by the aid of these parallels that the batteries, dispersed over a wide area, concentrated their fire upon the revetments. Not only were these parallels formed to approach the walls of the fortress, but the resources in men and ammunition were, by the nature of the case, largely in favour of the besiegers, who were constantly harassed by the artillery of the besieged. Therefore a line of circumvallation or a covering field army was employed. The former mode of protection provided for the surrounding of the place attacked with a high bank of earth, while the latter, by virtue of its greater mobility, was able to meet the relieving army many miles from the line of action. This mode of warfare gave rise to an immense technical literature from the reign of Louis XIV. to the

end of the eighteenth century, probably because the warfare of position was suited to the politics of alternating aggression and diplomacy, and also to the tactics of small, professional, non-national armies of the seventeenth and eighteenth centuries. The possession of this or that fortress could be used as a counter for diplomatic bargains, and its capture or denial to the enemy was a more satisfying objective for a mercenary general than the destruction of the enemy main force which might mean an untimely end to the war, the disbanding of the victors, and the unemployment of their commander. Hence the need for an elaborate technique whose fine points would be intelligible to the monarch or minister who employed such commanders.

When a more realistic and ruthless mode of warfare was adopted by the armies of the Fr. revolutionary period, S. warfare receded to a position of lesser importance, and as the nineteenth century progressed the power of artillery to destroy rapidly outstripped the skill of military engineers to protect fortresses. Though money and labour were still lavishly expended on fortifications only two protracted S. of military importance occurred in that century, in Sevastopol (*q.v.*) and Paris (*q.v.*). At the outset of the war of 1914 the forts of the Fr. and Belgian frontiers proved as little effective as in 1870, and when the defensive finally asserted itself as the offensive the war in the W. was stabilised about a system not of fortresses, but of field works.

In the Second World War, while it was demonstrated that under modern conditions no purely military fortress could stand a S. of any length, a large fort. tn. could do so, and though it could not continue to function as a tn., could yet maintain a kind of life devoted to purely military ends. Tobruk was twice besieged, and so were all the Atlantic and many of the Channel ports of France. Stalingrad was the scene of two successive S., first of the Russian garrison by the Gers, and then vice versa. Leningrad sustained the longest S., and was also the most expensive. Despite the ingenuity of defensive military engineers the only effective obstacle in *depth* to tanks is a large built-up area, and only the very largest built-up areas can provide cover for the rearward services as well as for the fighting troops of major formations as now organised.

The state of S. provides for the suspension of civil law, which is made subordinate to military law. A fortress, city, or dist. is thus put under martial law, i.e. under the authority of the military power. This may occur in the case of (1) the presence of an enemy, as at a S.; (2) the failure of the civil power in cases of domestic insurrection; and (3) the occupation of a conquered dist. by the military.

Siegen, Ludwig von (1609–c. 1680), Ger. artist, b. at Utrecht. He became a soldier in the service of the landgrave of Hesse. In 1643 he produced the first reputed mezzotint, a portrait of the landgrave's mother. In 1654 he showed his method

to Prince Rupert, who introduced it into England.

Siegen, tn. in N. Rhine-Westphalia, Germany, on the Sieg R., 65 m. by railway E. of Cologne. It has iron-foundries and other industries connected with iron (of which ore deposits exist), lead, and copper. Pop. 37,300.

Siegfried, or Sigfrid, *see* NIBELUNGEN-LIED.

Siegfried Line: 1. Or Hindenburg Line (*q.v.*), name given by the Gers. to the line of defence taken up by their armies in France in Sept. 1918. It ran through Méuvres, Flesquières, across the Canal du Nord, Havrincourt, Trescault, Gouzeaucourt, Villers-Guilain, and eastward of Hargicourt. The Brit. victory of Epéhy, which was complete on Sept. 18 after six days' heavy fighting, led to the abandonment of this line of defensive works, after it was pierced at its strongest point, the Drocourt-Quéant (*q.v.*) Switch. 2. Name given by the Brit. to the West Wall (*q.v.*) or line of fortifications constructed opposite the Fr. Maginot line. *See* WESTERN FRONT IN SECOND WORLD WAR.

Siemens, Ernst Werner von (1816–92). Ger. electrician, b. at Lenthe, in Hanover. He became superintendent of the artillery workshops at Berlin (1841), and laid the first telegraph line in Germany between that tn. and Frankfurt-on-the-Main (1848). One of his most important contributions to practical science was the dynamo. He founded the world-famous firm of S. & Halske, and was associated with the London firm of S. Brothers. He founded the Physikalisch-Technische Reichsanstalt at Charlottenburg (1886), and pub. many scientific and technical articles. *See* his *Personal Recollections* (Eng. trans., 1893).

Siemens, Sir William (Karl Wilhelm) (1823–83), electrical engineer, the youngest brother of Ernst Werner von S., b. at Lenthe, in Hanover, and settling in England in 1844 was naturalised in 1859. His inventions were chiefly concerned with the application of heat and in the field of metallurgy, and, as manager of the firm of S. Brothers, he constructed the Portsmouth electric tramway (1883) and many overland and submarine telegraphs. Elected a fellow of the Royal Society in 1862, and president of the Brit. Association in 1882. *See* life by Dr. William Pole, 1888.

Siemens Concern, general name for the vast Ger. commercial undertaking founded in 1847 by Ernst Werner von Siemens (*q.v.*). One of the two chief branches of this concern was the company, Siemens & Halske, which specialised in telephony, copper refining, etc.; the other, Siemens-Schuckentwerke, dealt with heavy current. Siemens-Bau Union, an allied concern, was a civil engineering company. S. C. was also associated with Siemens Brothers & Company, of London, and other Brit. Siemens undertakings.

Siemens-Martin, Open Hearth Process, *see* under IRON AND STEEL.

Siemianowice (Ger. Laurahütte), tn. in Polish Silesia, with huge iron works. It is 5 m. S.E. of Beuthen.

Siem Rap, or Siem Reap, tn. of Fr. Indo-

China, ceded by treaty from Siam (1907), 220 m. E. by S. of Bangkok, near the N. end of Lake Tale Sap, in the dist. containing the ruins of Chingkor.

Siena, or **Sienna**: 1. Prov. of Italy, in Tuscany, situated between the provs. of Florence (on the N.) and Rome (on the S.). It is principally an agric. area., the products including wheat, olives, silk, and wine. Area 1471 sq. m. Pop. 277,600. 2. Cap. of the above prov., an archiepiscopal see, 31 m. S. of Florence. It has a univ., founded 1300, and many beautiful old buildings. Twice a year, following anct. tradition, on July 2 and Aug. 16, there is a horse-race on the Piazza del Campo in which a representative of ten of the seventeen *contrade* or dists. of the city compete for the *Pallo*, a decorated silk banner. S. suffered damage in the Second World War. The cupola of the convent of the Osservanza was almost entirely destroyed by direct bomb hits, which also caused the complete collapse of the roof, aisles, chapels, and sacristy, and the windows of the cathedral were broken. The Gers. planted mines in the city, but a plan of their lay-out was found, and they were all taken up before any harm was done. S. was captured by Fr. forces on July 3, 1944. Pop. 52,600. See E. Gardner, *Siena* (Medieval Town Series), 1902, and H. A. Newell, *Sienna and its Surroundings*, 1926.

Sienkiewicz, Henryk (1846-1916). Polish novelist, b. at Wola Okrzeńska, in Siedlce, and educated at Warsaw Univ. His novels are characterised by patriotism and religious fervour. *Quo Vadis?* (1895), which gives a vivid picture of the society that surrounded Nero, has been trans. into many languages, and been produced on the stage all over Europe and in America. Among the Eng. trans. of his novels are a trilogy, *With Fire and Sword* (1890), *The Deluge* (1891), and *Pan Michael* (1893); *Without Dogma* (1893); *Children of the Soil* (1895); *Let Us Follow Him* (1897); *Sienkanka* (1898); *In Vain* (1899); and *Knights of the Cross* (1900). He was awarded the Nobel prize for literature in 1905. See Monica M. Gardner, *The Patriot Novelist of Poland: Henryk Sienkiewicz*, 1926.

Sienna consists of hydrated ferric oxide, manganese dioxide, and earthy matter. There are two varieties, 'raw' and 'burnt,' the former being dull brown in colour and the latter formed, as its name implies, by heating the 'raw' S. a bright red. Both varieties are used as pigments.

Sieradz, tn. in the dist. of Kalisz, Poland, on the Warta, 110 m. S.W. of Warsaw. Pop. 7000.

Siero, tn. in the prov. of Oviedo, N. Spain, on the R. Nora; it has agric., coal-mining, and tanning industries. Pop. 29,100.

Sierra, Gregorio Martínez (1881-1947), Sp. playwright and novelist, b. in Madrid. After leaving Madrid Univ. he carried on business as a publisher, being a very prolific writer as well (largely in collaboration with his wife). In addition to much original work, he also produced some fifty trans. and adaptations of works by foreign dramatists. Early in his life

he joined the Sp. Art Theatre, which was founded by his early exemplar, Jacinto Benavente (q.v.). His first real success was *The Cradle Song*, produced in 1911. Many trans. of his forty plays were produced in England by J. G. Underhill and Harley Granville-Barker. Among them are farcical comedies, such as *Sueno de una noche de Agosto* (trans. as *The Romantic Lady*, 1918), *Madame Pepita*, *The Lover*, and *Take Two from One*, and carefully fashioned studies of character reflecting the worth of homely virtues, such as *The Cradle Song*, *El Reino de Dios* (trans. as *The Kingdom of God*), 1916, *Navidad* (*Holy Night*), 1916. In both kinds there is tender and discerning vision and, above all, the glad suffering of fools in which his fellow countrymen saw spiritual affinities with the work of Cervantes. S. lived in voluntary exile in S. America during the civil war, only returning to Spain in the year of his death. His other works include *Los Pastores* (1913); *Margot* (1914); *Las Románticas* (1914); *Esperanza*, *nostra* (1917); *Horas de Sol* (1918); *Granada* (1920); *Don Juan de España* (1921); *El Poema del Trabajo* (1921); *El Corazón Ciego* (1922); *Mujer* (1924); *Un Teatro de Arte en España*, 1917-25 (1926); *Seamus Infelices* (1930); *Espana-Andalucía* (1930); and *Triángulo* (1930). A collection of his plays, trans. into Eng., was pub. in 1923.

Sierra, Sp. name for a range of mts. with serrated or irregular ridges, such as the Sierra Nevada.

Sierra Blanca, range of the Rocky Mts., Colorado, U.S.A.; the highest point is Blanca Peak (14,464 ft.).

Sierra Leone, Brit. colony and protectorate on the W. coast of Africa, lying between 6° 55' and 10° of N. lat., and 10° 20' and 13° 25' of W. long. The sea coast, 210 m. in length, extends from Kragba at about lat. 9° N., on the border of Fr. Guinea, to the Mano R. at lat. 6° 55' N. on the border of Liberia. It is bounded W. by the Atlantic, N. and E. by Fr. Guinea, and S. by Liberia. The colony portions of this area, i.e. the ters. acquired by the Crown by treaty of cession or otherwise, consist of the S. L. Peninsula, in which is situated Freetown (seat of government), Sherbro Is., the Is. of Tasso, Banana, Turtle, York, Buia Dhaye, and other small islets, the Lower Lokko and Matoki chiefdoms in the N. Prov., the Bumpo, Kagboro, Bagru, Mana Bagru, Tindell, Bendu, Cha, Mongoba, Bullon, and part of the Manose Krim chiefdoms in the S. Prov. Included also is a strip of land along the entire coast varying in depth up to a mile. Of these areas the peninsula of S. L., Tasso, Banana, and York Is., and the township of Bonthe in Sherbro Is. only, are administered as strictly colony; the other areas are administered as part of the protectorate. The protectorate extends inland for about 180 m. Total area 30,170 sq. m. Pop. (estimated 1940) of colony, 121,000 (Europeans 400); protectorate (estimated 1949), nearly 2,000,000. The peninsula of S. L. is 25 m. long and from 10 to 12 m. broad

at its widest part. Unlike most of W. Africa, S. L. has high land near the sea. It is formed by a range of volcanic mts. running parallel to the sea, the chief summits reaching a height of 2000 to 3000 ft. These mts. are thickly wooded and intersected by ravines and small valleys. In the protectorate the riv. banks are low and swampy, but at a distance from the rivs. the land consists of low rolling downs and, here and there, low ranges of hills. The country is well watered by rivs., the Great and Little Skarrels, the Rokell (or S. L.), the Sherbro, the Jong, Mano, and others all emptying into the Atlantic, and most of them navigable for sev. m. Freetown lies some 4 m. up the Rokell, at 2900 ft. above sea level. The climate of S. L., like that of other parts of W. Africa, is unhealthy, but epidemiological conditions have greatly improved through the efforts of the medical and sanitary services. The wet season lasts from May to Oct. The shade temp. varies from 62° to 97° F. Tornadoes occur at the beginning and end of the wet season, but are of short duration. The average ann. rainfall at Freetown is 166 in. The 'Harmattan' wind blows from Dec. to March, bringing dust from the Sahara.

Many dists. in the protectorate are fertile and well adapted to the growth of oil palms, coco-nuts, kola nuts, gum-producing trees, cocoa, rice, etc. Mineral production is now of great importance, the chief minerals being diamonds, platinum, iron, hematite, and gold. The chief products exported from the colony are palm kernels, palm oil, sesame, kola, ground-nuts, ginger, and hides. The chief agric. work lies in the cultivation of rice and cassava for local needs. The kola tree is found near most of the vills., and yields much of the revenue. Gun, copal, and nutze are also produced. In the protectorate the iphab., besides planting rice and cassava, also weave 'country cloths' of good texture and handsome design. Other flourishing local industries are mat and basket making, and a certain amount of ornate leatherwork. There is a good fishing industry at Sherbro, large quantities of dried fish being transported inland. The chief exports from the protectorate are palm kernels, palm oil, kola nuts, pepper, cocoa, ginger, piasava, native-grown coffee, and beeswax. Imports consist mainly of cotton goods, spirits, tobacco, groceries, and hardware. Exports in 1946 were valued at £2,139,624 and imports at £3,961,384. Revenue totalled £2,195,474 and expenditure £1,833,483.

The main line of the state railway runs 227 m. from Freetown to Pendembu, a trading centre near the boundaries of Liberia and Fr. Guinea; a branch line of 104 m. from Kola to Kaniabul serves the N. Prov. and there is another branch line to Makoni, 83 m. in length. In 1947 336 m. of line were open. The roads are divided into motor roads and chiefs' roads; the latter, which are maintained by tribal authorities, are not usually open to heavy vehicles. Motor roads are constructed

and maintained by the Public Works Dept. Some 253 m. of road in Freetown and the peninsula are gravelled with laterite or bitumen surface. A new motor road, 80 m. long, was completed in 1939 along the coast of the peninsula. The Sherbro R. is navigable for over 20 m. up to York Is., the Rokell R. for 40 m. There is a frequent, regular steamer service between Liverpool and Freetown. Lungi, near Freetown, is S. L.'s only civil airport. W. African Airways Corporation provide a twice weekly inter-colonial service linking S. L. with the other Brit. W. African colonies, Dakar, and Liberia. There are approximately 26,000 m. of telegraph and telephone lines, and a wireless station was opened in 1913.

More than 26,000 children were being instructed in gov. assisted mission and other schools in 1948. Higher education is provided at Fourah Bay College, which is affiliated to the univ. of Durham. Until the foundation of Achimota College in the Gold Coast, Fourah Bay was the only institution of its kind in W. Africa. It has given univ. courses in arts and theology for over fifty years, and some of its graduates occupy prominent positions in the professions on the W. African coast. Teachers' training courses in agriculture are given at Mbank Academy and at Njala station. The Sir Alfred Jones Technical College gives instruction in carpentry.

The country is administered as a crown colony. The governor and commander-in-chief of the colony is also the governor of the protectorate. The protectorate is divided into three provs., N., S.E., and S.W., each under a prov. commissioner. Administrative control of the whole protectorate is vested in the chief commissioner, whose headquarters are at Bo. There are thirteen protectorate dists., each in charge of a dist. commissioner. There are 196 chiefdoms, each ruled by a paramount chief; 113 chiefdoms, covering 80 per cent of the pop., have been organised as native administrations since 1937. These have their own treasures and are responsible, under the supervision of the dist. commissioner, for the local administration and development. Provision has recently been made for the estab. of dist. councils and a protectorate assembly, which will serve in the first instance in advisory capacities. There is a nominated executive council and a partly nominated, partly elected legislative council, each common to the colony and the protectorate. Under the new constitution of July 30, 1948, the legislative council comprises seven elected members for the colony, one nominated and thirteen elected members for the protectorate, two nominated members with experience of public affairs and a knowledge of economic conditions (they may be European or African), and seven official members. Candidates for election must be over twenty-five years of age; their term of office is five years. Women cannot vote. The legislative council may pass measures applicable to the whole ter. With the exception of the urb.

areas of Freetown and dist., the country is divided into chiefdoms owned and administered by tribal authorities.

Most of the tribes of the protectorate have come under the influence of Islam, particularly in the N. The protectorate is, however, predominantly pagan. Christian missions work in all parts of the protectorate, but conversion to Christianity has not been on an extensive scale. The colony area is largely Christian. S. L. is a diocese of the Church of England, and the Rom. Catholic Mission constitutes a vicariate apostolic of the Rom. Catholic Church.

History.—Discovered in 1462 by the Portuguese navigator, Pedro de Sintra, S. L. became in 1786 a settlement for freed slaves. The colony of S. L. originated in the sale and cession in 1788 of a piece of land by 'King' Nembana and his subordinate chiefs to Capt. John Taylor of his majesty's brig *Miro* on behalf of the 'free community of settlers, lately arrived from England'; this piece of land was called Frenchman's Bay, later changed to St. George's Bay. The main purpose of the colony in its inception was to secure a home in Africa for a number of African natives who from various circumstances had been separated from the countries of their origin and were destitute in and about London. Later the colony was used as a settlement for Africans rescued from slave-ships during the period when England was making every effort to suppress the overseas traffic in slaves. The enterprise of 1788 indeed proved a failure, and in 1791 a new settlement was formed, the promoters being Alexander Falconbridge, Sir R. Carr Glynn, Granville Sharp, and Wm. Wilberforce. These pioneers obtained a charter of incorporation as the S. L. Company, but the company in 1807 transferred its rights to the Crown. The ter. received additions from time to time by various concessions from the native chiefs. Thus on July 10, 1807, 'King' Farina and 'King' Tom ceded all the land they possessed in S. L. lying to the westward of the settlement, and on Jan. 1, 1808, the whole settlement became a crown colony; in 1861 Bal Conteh, 'king' of Koya, with his chiefs, ceded a portion of the Koya country abutting on the colony of S. L., measuring 10 m. in width and 16 m. in length. In 1825 the governor of S. L. made a treaty with various chiefs in, and in the neighbourhood of, Sherbro, for the purpose of adding these countries to the ter. of the colony. The treaty, not immediately ratified by the Crown, was revived by a new agreement made in 1882. The protectorate, forming the hinterland of the colony, was formed in 1896. Its area was considerably extended during the 1860s, but as late as the eighties there was serious conflict with the native tribes over slave trading, which culminated in 1898 in a rising of the Meude and the massacre of missionaries and native officials. In 1886 Freetown was made the cap. of the new general gov. set up for the Brit. settlers, and in 1896, following on the Anglo-Fr. and Anglo-Liberian Boundary Agreements, a proclamation of a Brit. protectorate was issued.

See J. J. Crooks, *History of the Colony of Sierra Leone*, 1903; T. J. Alldridge *A Transformed Colony: Sierra Leone as it was and as it is*, 1910; N. W. Thomas, *Anthropological Report on Sierra Leone*, 1916; H. C. Lake, *A Bibliography of Sierra Leone*, 1925; T. N. Goddard, *Handbook of Sierra Leone*, 1925; F. W. H. Migeod, *A View of Sierra Leone*, 1926; F. W. Butt-Thompson, *Sierra Leone in History and Tradition*, 1926; F. A. J. Utting, *The Story of Sierra Leone*, 1931; and H.M.S.O., *Annual Report on Sierra Leone* (1947), 1949.

Sierra Leone River, Sierra Leone, situated 8° 30' N. by 13° 10' W., and lies south of the estuary of the Scarcus.

Sierra Madre, one of the prin. mt. chains of Mexico, beginning N. of Mexico city and extending into New Mexico. It divides into three branches, enclosing the central plateau of Anahuac. Average altitude 8000 ft.

Sierra Madre (Colorado), see SAWATCH. **Sierra Maestra**, mt. chain near the south coast of Cuba, extending from Cape Cruz to Guantanamo; the highest point is the Pico Turquino (8400 ft.).

Sierra Morena, see MORENA, SIERRA.

Sierra Nevada (Sp. for 'snowy range'): 1. Aggregate of mt. ranges, about 430 m. long, in the E. part of California, U.S.A., containing Mt. Whitney (14,502 ft.), the highest point in U.S.A., excluding Alaska. Silver and gold are found, and the sequoia tree grows on the W. slopes. 2. Mt. range of S. Spain in the provs. of Granada and Almería. Its culminating point is the Cerro de Mulhacen (11,421 ft.). Persistent snow begins at 10 000 ft. altitude. 3. S. N. de Merida, mt. range of S. America, a N.E. extension of the E. Cordillera, dividing the Zamora and Mérida provs. Concha and Coluna, both 15,400 ft., are the prin. peaks.

Sieveling, Sir Edward Henry (1816-1904), Eng. physician, b. in London. He became a member of the Royal College of Physicians (1847); editor of the *British and Foreign Medical and Chirurgical Review* (1855-60); consulting physician to St. Mary's Hospital (1851); physician in ordinary to Queen Victoria (1888-1901); and physician extraordinary to Edward VII. (1901-4).

Sifanto, see SIPHOTOS.

Sigebert, Saint (d. 635), king of E. Anglia. Baptised in France, he introduced Christianity into his kingdom, with the help of Sts. Felix and Fursei. He entered a monastery, which he was compelled to leave to lead his subjects against the pagan king, Penda of Mercia, in which conflict S. was killed.

Sigrid, Saint (d. c. 1045), Eng. monk and priest, probably of Cliftonbury. He went as a missionary to Norway at the request of King Olaf, and achieved great success, one of his converts being Olaf himself.

Sigrid, see N. HELUNGENLIED.

Sighisoara (Sondassburg), see SEGESVAR.

Sight, see BLIND; COLOUR-BLINDNESS; EYE; OPTICS; VISION, *Defects of Vision*.

Sight, Bill of see BILL OF SIGHT.

Sightseeing. The anct. Gks. had their guide-books, and it was they who conceived the first great tourist epitome of superlatives, the Seven Wonders of the World: the Pyramids of Egypt, the Hanging Gardens of Babylon, the Temple of Artemis (Diana) at Ephesus, Phidias's Statue of Zeus at Athens, the Mausoleum at Halicarnassus, the Colossus at Rhodes, and the Pharos at Alexandria. These were reckoned to be the prin. sights of the anct. world, and for the reason that each was calculated to stimulate instantly the most vital reaction that any one who goes S. can hope to have—the emotion of wonderment. Under the ægis of religion the sightseer may be recognised as the pilgrim, Christian, Muslim, or Buddhist. Under the ægis of education we may recognise the post-Reformation Eng. sightseer doing the Grand Tour. To-day he travels in the name of recreation. In all these guises can be noticed the same primitive implanted impulse, to fare forth seeking the same halts at sights (or shrines) of varying repute where he shall be rewarded with the same satisfactions of zeal and curiosity. The organisation of S. is now a recognised commercial activity under the heading of tourism (q.v.). Already the state is taking a leading part in this business, which was formerly left to private enterprise, and seeking to attract foreign visitors, thus creating a new source of national income. See E. Vale, *See for Yourself*, 1933.

Sights for Shooting. (a) *Rifles.*—The 'open' sight is used on nearly all military rifles: it consists of a foresight near the muzzle and a backsight. The foresight has a blade and the backsight is notched. The backsight is usually fixed at about 15 in. from the eye when firing. The backsight has a leaf on which are marked graduated distances, and a slide is fixed which moves along the leaf for adjustment of distance. The 'aperture' backsight consists of a small circular aperture through which aim is taken; it is placed nearer the eye than the notched sight. Although a more accurate aim is obtained with this sight, it has the disadvantage of making the target more difficult to find and easily becomes clogged with mud. Telescopic sights in various forms are used on snipers' rifles, but their small field of view and fragility are drawbacks. Small naval guns and anti-tank guns, both used for direct fire, are fitted with these sights, which in one form were in use as early as the Amer. War of Independence. (b) *Machine Guns.*—The foresight is the same as in rifles, and the backsight has either a U or V notch or is of the aperture pattern. 'Battle sights' are fixed sights for use within limited ranges, usually 200 metres. 'Night sights' are auxiliary sights used in conjunction with 'bar foresights' to enable machine guns to be used at night. 'Anti-aircraft sights' are designed to enable allowance to be made for speed of the target as well as its elevation. The commonest type is the 'cart-wheel.' Machine guns in aircraft are fitted with sights of this type, as are lighter A.A. guns equipped for direct fire.

(c) *Artillery Guns.*—These are highly complicated and scientific instruments, the essential components being a rocking-bar, clinometer, and foresight and backsight. They are not used to align the gun on the target proper, but on an aiming mark on which all the guns of a battery are trained initially. Alteration of elevation and direction are then made to bring all guns to bear on distant targets.

Sight, Short, see MYOPIA.

Sight-testing, see under REFRACTION, ERRORS OF.

Sigillaria, genus of fossil coal-measure trees, some of which attained a height of nearly 100 ft. The stem was deeply fluted, with seal-like scars where short cone-bearing branches were borne. They have been ranked among the Lycopods, and reached their maximum in the Carboniferous period.

Sigismund (1361-1437), Holy Rom. Emperor from 1410, a son of Emperor Charles IV. He succeeded his father as margrave of Brandenburg (1378), and on the death of his father-in-law, Louis the Great, became king of Hungary (1387), and in 1410, on the death of Rupert III., was elected Holy Rom. Emperor, and was crowned in 1414. S. was a prominent member of the Council of Constance (1411), which brought the Great Schism to an end, and was involved in the death of John Hus, an event which roused the Bohemians against him so that it was only after seventeen years of war that S. was able to enter their cap. as king. S.'s character is still disputed by historians. It is hard to decide whether he was the better Catholic or Imperialist. His support made possible the Council of Constance; yet the overriding consideration he gave to imperial diplomacy wrecked it, and in sanctioning the condemnation of Hus, S. would seem to have used a religious instrument to crush a movement which was most repugnant to him because of its nationalist tendencies. This dualism of character and ambition prevented him, in spite of his intelligence and capability, from achieving very much of endurance in either Church or State.

Sigismund, name of three kings of Poland. *Sigismund I.*, surnamed the Great (1505-48), the son of Casimir IV., born in 1467, waged almost continuous war with Muscovy and Russia. He was a just and kindly ruler and, though himself a Catholic, protected Protestants and Jews from persecution. His court was troubled with the intrigues of his beautiful and wealthy wife, Bona Sforza. *Sigismund II.*, surnamed Augustus (1543-1572), was born in 1520. He was a tactful diplomatist, and through him the union of Lublin was brought about. *Sigismund III.* (1586-1632), the nephew of S. II. and son of John III., king of Sweden, was born in 1566, and elected to the Polish throne in 1587, succeeding his father in Sweden in 1592. His reign was disturbed by risings of the nobles, by wars with the Turks, and by the persecutions of the Protestants. See A. Fokolowski, *History of Poland*, 1904, and O. Halecki, *History of Poland*, 1942.

Sigmaringen, tn. of Württemberg, Germany, on the Danube, 55 m. S. of Tübingen. It was once the cap. of the duchy of Hohenzollern-S. There are iron foundries near by. Pop. 35,300; (tn.) 6000.

Sign, in mathematics. The four elementary S. in arithmetic are $+$, $-$, \times , and \div , and respectively denote addition, subtraction, multiplication, and div. The first is referred to in algebraic formulæ as the *positive* or *plus* S., and the second as the *negative* or *minus*. Other S. in common use are $=$ (equals), $<$ (is less than), $>$ (is greater than), \equiv (is identically equal to), $\sqrt{}$ (square root), and ∞ (infinity). See also **SYMBOLS**.

Signals and Signalling. Success in military operations is largely dependent upon the rapid distribution of essential intelligence among one's own forces and the interruption or prevention of a like distribution among the enemy forces. The competition among nations for improved means of communication ensures the maintenance and development of interest in the scientific aspect of the subject.

MILITARY.—As the speed and complexity of modern warfare increase so does the military commander at all levels, from the theatre commander-in-chief down to the commander of every tank and infantry platoon, depend more and more on rapid and efficient communications to obtain and exploit success on the field of battle. The prin. purposes for which such communications are required can be divided broadly into four categories: (a) to give commanders and their staffs a constant supply of information on the dispositions, movements, and activities of their own and enemy troops; (b) to enable commanders to issue operational and administrative orders; (c) to establish the most direct contact possible between forces requiring special liaison facilities, e.g. the air arm in support of ground forces, and those involved in normal close support functions such as artillery support of infantry or tank units, and tank support of infantry; and (d) to keep other formations in the area of battle fully supplied with information on all matters detailed in the categories listed above.

Development.—Up to and including the beginning of the nineteenth century musketry was comparatively poor in quality of both weapons and ammunition and in the range at which much effect could be achieved; the cavalry had a considerable degree of mobility but their weapon range was limited to the length of their lances or swords; the main support-arm, the artillery, had a strictly limited range and limited killing power, as the exploding missile, or shell, had not yet been introduced on any great scale. At this time, therefore, the trumpet and bugle sufficed as short-range control signals in battle, and mounted dispatch-riders and runners served to pass orders and messages over longer distances. During the nineteenth century musketry improved in range, reliability, and accuracy, mobile and more effective artillery came into service, the machine-gun was introduced, and the

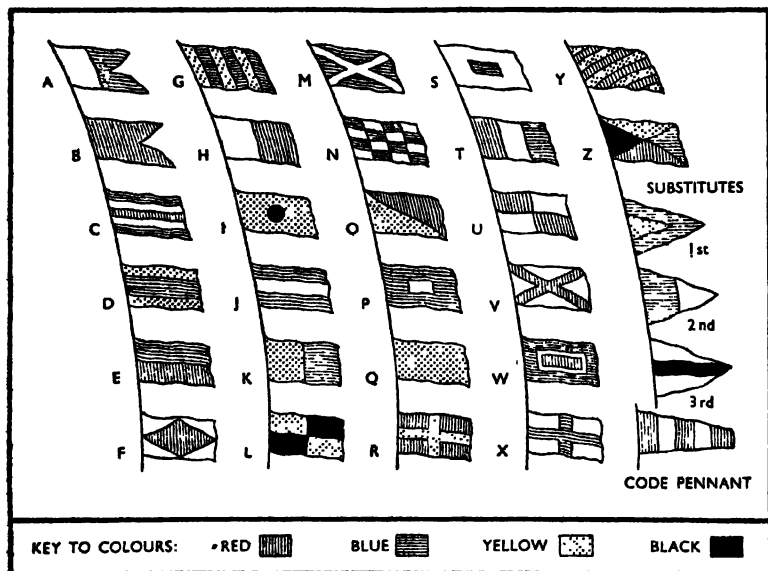
tactics of the normal battle changed substantially. Signals now had to pass over greater distances faster and with greater security—denial of signals to the enemy. Artillery developments were the greatest single factor. Once the range had become so great that the fall of shot could not be observed from the gun-lines, instantaneous communication between the observation post and the gun-position officer with the battery became necessary. Signalling by lamp, flag (Morse (see under **TELEGRAPHY** for code) or semaphore (q.v.)), and heliograph from defiladed positions was therefore adopted. These methods were introduced before the First World War, but towards the end they were used to a lesser degree as line telegraphy and line telephony (L.T.), came into general service. During that war wireless (telegraphy) was first used for military purposes, mainly between higher formations. Between 1918 and 1939 all signalling equipment became lighter, more efficient, and less fragile. During this period radio telephony (R.T.) was introduced throughout field forces; and as wireless and line fulfilled all normal field requirements, visual signals became obsolete.

Systems in Use To-day.—Line telegraphy (Morse) has a slightly greater range than line telephony but is appreciably slower. For this reason it is used very little nowadays. Line telephony, for speech, gives quick, high-quality communication. Line circuits can be 'boosted' so that range is not a serious limitation. A good degree of security is afforded by line circuits. Sev. subscribers can be connected at once; with special equipment sev. conversations can be carried on simultaneously on one line without interference. But line telephony cannot form the link with tanks, vehicles, aircraft, etc. Wireless telegraphy (W.T.) in Morse, and radio telephony (R.T.) for speech, give rapid communication to an unlimited number of receiving stations provided they are within range. Wireless telegraphy is slower but gives greater range; hence channels for urgent operational traffic are usually by radio telephony. Security is poor, as the enemy can receive and understand all traffic unless it is in code or cipher; such security measures greatly reduce the speed of communication. Wireless communications, unlike line telephony, are usually one-way, i.e. only one station of a group can transmit at a time, others must speak in turn subsequently. Both radio telephony and wireless telegraphy are suitable for use to moving stations, e.g. tanks and aircraft, and as opposed to line telephony, use a channel which is invulnerable and can only suffer interference as long as natural (atmospheric) or man-made (jamming) disturbances continue. In view of the wide distribution of wireless sets in the army (e.g. every tank has one or more) great care is required to prevent overlapping (jamming) between the many wireless stations in any given area of battle.

Other Methods.—Dispatch riders are mounted on motor-cycles, or sometimes

in jeeps. They provide a thoroughly secure but slow method of communication and, as opposed to wireless or line, can carry lengthy messages and with them more bulky matter, such as maps and diagrams. Carrier pigeons are nowadays little used for normal communications in the field. For guerilla warfare in the Second World War they were frequently used, particularly when modern signalling equipment could not be used. Com-

used a coloured flag for each letter of the alphabet, but Brit. naval signalling remained slow and inefficient, messages being dependent not so much upon the combination of flags as upon the positions on the masts, yards, and rigging where they were displayed. A really efficient system was not evolved until the beginning of the nineteenth century, when Sir Home Popham introduced a new system, whereby each flag was given a



THE INTERNATIONAL CODE OF FLAG SIGNALS

Flags are either hoisted singly or in groups of two, three, or four. Among four-flag hoists are ships' names (every ship is allocated four signal letters) and geographical positions. Special meanings of some flags are A, 'Am on speed trials'; C, 'Yes'; D, 'Keep clear of me'; F, 'I am disabled'; G, 'I want a pilot'; K, 'Stop your ship'; L, 'You should stop. I have something important to communicate'; N, 'No'; O, 'Man overboard'; P, 'Repair on board. Am proceeding to sea'; Q, 'Quarantine'; S, 'Am going full speed astern'; U, 'You are standing into danger'; V, 'I require assistance.'

munications from ground forces to aircraft are principally by radio and wireless telephony. When these methods are not used signals (of limited meaning) can be made visually. Aircraft communicate by dropping written messages in containers, or by certain movements in the air or by flashing their landing lights. For special purposes such as calling for fire support, indicating targets, reporting the success of an operation, etc., coloured (Very) lights and flares are used.

NAVAL.—Signalling at sea by means of coloured bunting was introduced early in the seventeenth century, but for many years it was a lengthy and cumbersome process. It was the Fr. in 1660 who first

number, combinations being able to express any figure from 1 to 999. The first twenty-six combinations referred to letters of the alphabet, while each of the remaining 973 expressed a simple word or phrase. It was the Popham code which was used at Trafalgar. Nelson's famous message being signalled by twelve groups of numbers. In 1817 Capt. Marryat simplified the Popham code, and introduced a system which forms the basis of all flag S. to-day. Marryat's code was adopted for the first official commercial code of flag signalling drawn up in 1857, flags now representing letters, and thirty years later this was developed into the international code. During the First World

War the international code broke down badly and, after many revisions, the present international signal code was drawn up by an editorial committee representing eight nations, and universally adopted in 1934. Meanwhile navies had developed flag codes of their own, but after the Second World War the whole basis of flag signalling in the Brit. Navy was radically altered. The number of signal flags had also steadily increased and many ships carried three sets of flags, i.e. R.N., international, and U.S. Navy. Ho, in 1948, it was decided to scrap the naval code, adopt entirely the international alphabet (the U.S. Navy had already done so), and use the same numeral flags as the U.S. Navy. In addition there are certain special flags and pendants for naval use. The R.N., of course, retains its own code, groups of flags meaning one thing in the navy and another in the international code. If signalling with the latter, hoists follow the code pendant. Other forms of visual signalling include semaphore and morse, searchlight signalling projectors or flashing lamps being used for the latter. Wireless and radio telegraphy are also in constant and growing use, requiring a complicated organisation of wave-lengths for various purposes. The siren is also used for special emergency S., during fog, and to indicate the direction in which ships are turning when there may be danger of collision. The employment of a particular method and wave-length is governed by the circumstances of the moment, but the communications organisation in the navy to-day is recognised as one of vital importance, failure of which can imperil important operations and be the prime cause of disasters. Upon the accurate and rapid receipt of reports of the position of an enemy (e.g. from outlying air or surface units) will depend the success of any subsequent action.

Signals of Distress, etc.—The code signal is NO, but the 'distant signal', a square flag with a ball, is used, or a reversed ensign, or the firing of the minute gun. At night the minute gun, flares from any burning material, or single rockets or shells fired at intervals, are signs of distress. Aircraft distress S. consist of red lights fired into the sky, and the international distress call 'mayday' by means of R.T. Other special S. have become customary. Thus P, a blue and white flag, signifies that the vessel is about to put to sea; Q is the call for a pilot; quarantine is denoted by Q, a plain yellow flag; three black balls in the daytime, three red lights at night, shown vertically, are the sign of a breakdown. In dirty or obscure weather anchored vessels ring a bell; sailing vessels make one, two, or three blasts on a fog-horn; fishing vessels sound the bell and fog-horn alternately; steam vessels give long blasts on the siren, the interval being not more than 2 min. Success has been achieved in submarine S.; a bell submerged beneath the surface of the water is sounded, and can be heard on a telephone receiver as far as 8 m. Other methods have also been developed.

COASTGUARD.—At coastguard stations

there is a system of S. to give warning of gales and their probable direction. By day a cone is hoisted: with the apex upwards* it indicates a northerly gale and with the apex downwards a southerly gale. By night three lights in the form of a triangle are used on the same principle.

For the morse code see TELEGRAPHY.

See also SEMAPHORE; RAILWAYS.

Signals, Traffic, see TRAFFIC REGULATIONS AND SIGNS.

Signature, see DEED.

Signature, in music, is applied to key, which is described by the tonic of the scale in which a composition is written, e.g. A, A \sharp , A \flat , and can be either major or minor, the sharps or flats of the key are written at the beginning of each staff; or to time, indicating the rhythmic structure, written on the staff at the beginning of the work, e.g. $\frac{3}{4}$, three crotchets to a bar, or $\frac{3}{8}$, three quavers to a bar.

Signatures. The doctrine of, medieval medical theory which enunciated that the external aspects of plants and minerals are intended to indicate the diseases which they will remedy. Thus nature suggests by the black pupil-like spot in the corolla that Enphrasia, or eyebright, is good for the eyes, and similarly, by its saffron hue, that yellow turneric cures jaundice.

Signature Tune is a term used by dance bands for a popular tune of their choice which will identify them at the beginning and end of their acts.

Signet, or Privy Signet, one of the three legally recognised royal seals for authenticating documents, the other two being the great seal and the privy seal (see SEAL). The privy seal was used for letters patent before they passed the great seal, but by the Great Seal Act, 1834, a sign-manual warrant, countersigned either by the chancellor, a secretary of state, the first lord of the treasury, or any two treasury commissioners, is sufficient for affixing the great seal, and no future documents are to have the privy seal affixed thereto. The only function of the S. was to authenticate the sign-manual, but as grants under the sign manual are sufficiently authenticated either by counter-signature under the foregoing Act, or in some cases by one of the secretarial seals (e.g. warrants appointing colonial governors), there is now no further use for the S.

Signet, Writer to the, class of legal practitioners in Edinburgh who formerly had important privileges, now nearly all abolished. They are so named because they were originally clerks to the office of the king's secretary, their duties being to prepare all warrants or charters for sealing with the king's S. Ws. to the S. now form a society under the presidency of the keeper of the S., who is a Crown appointee. The former Ws. to the S. were recognised as members of the college of justice in 1532.

Signia (modern Segni), ant. city of Latium, lying on the Volturn Mts., 35 m. S.E. of Rome. The ramparts, built of polygonal blocks of limestone, still stand.

Significations, Science of, see SEMANTICS.

Sign-manual, signature or mark made by a person upon any legal instrument to

show his concurrence in it. It now denotes specifically the signature of a reigning prince. In England a warrant under the royal S., countersigned by a secretary of state, has been, since 1884, a sufficient authority for passing any instrument under the great seal of the United Kingdom. The authenticity of the royal S. is admitted in courts of law upon production of the instrument to which it is attached.

Signorelli, Luca (c. 1441-c. 1524), It. painter, b. at Cortona, where he passed the greater portion of his life. To-day his finest work will be found in the chapel of S. Brizio, a part of the cathedral of Orvieto. See study by L. Dussler, 1927.

Sigurðsson, Jón (1811-79), Icelandic statesman and man of letters, b. at Rafnseyri, won for his oppressed is. freedom of trade (1851) and, after a spirited and lengthy struggle, complete home rule (1874). It is, moreover, due to his enlightened policy that Iceland now has a true centre of learning in Reykjavik. He ed. the *Diplomatium Islandicum*.

Sirt, prov. and tn. of Turkey, in the S.E., with frontiers with Syria and Iraq. Pop. of prov. 137,800.

Sikang, W. prov. of China, lying between Szechwan and Tibet, watered by the Yangtze. The cap. is Kangting known to the Tibetans as Tatsienlu. Other tns. are Yaan and Sichang. S. is theoretically Chinese, but has been governed only laxly by the central authority, and retains much of its individual character. It embraces almost all E. Tibet: the W. parts are entirely mountainous. There is no railway: two main roads link it with Szechwan and Chinghai, but the other roads are not known, and the exact topography of the area has not yet been determined. S. produces wheat and livestock, some gold is found. The giant panda is found in the mts. bordering S. and Szechwan. It has an area of 164,848 sq. m. Pop. 1,651,000.

Sikhs (Sanskrit *S'ishya*, disciple), community in the Punjab in N. India. Originally a small religious community, gathered round their founder, Nanak (1469-1539), they gradually grew into a nation because of their proselytising power. Nanak was succeeded by nine *gurus* or teachers, the last and most famous of whom was Govind Nanak, a humanitarian, aimed at combining Hindus and Muslims into one brotherhood by compromise. Thus he accepted the reincarnations of neo-Brahmanism and the mission of Mohammed. Arjun Mal, the fifth *guru*, compiled the *Adi Granth* and built the Sikh holy city of Amritsar; while his successor, Hargovind, allied himself to the Great Mogul, and led the S. in battle. Govind combated the Muslim power and religion, while he also repudiated the caste system of Hinduism. He taught that God could be found only in humility and sincerity, and wrote the second vol. of the Scriptures, which teaches the S. to worship one God, reject superstition, be strictly moral, and to live by the sword. As a result of his teaching the S. ultimately aspired to, and obtained, political independence, in 1764. In this *Khalsa*, or

commonwealth, there were twelve federated states or *misls*. Ranjit Singh (q.v.), chieftain of the *misla* of Sukarchakia, consolidated the *misla* into one large state under his rule in 1805. He promised and kept peace with the Brit., but on his death an unprovoked war broke out. There were two Sikh wars, the first in 1845 and the second from 1818 to 1849 when after the decisive victory won by Sir Hugh Gough at Gujrat (q.v.) the S. finally came under the rule of the Eng., and so well did the first Brit. (Dalhousie and the Lawrences) govern the Punjab that the S. aided the Brit. during the Indian mutiny.



Indian Railways Bureau

SIKH

Sikh Union.—The India-Pakistan frontier was drawn through the Sikh area, and there was a mass migration into the E. Punjab. A Sikh state was created on May 5, 1948, when seven Punjab states (Patiala, Kapurthala, Jind, Nabha, Faridkot, Maler Kotla, and Nalagarh) were merged into a union known as the Patiala and E. Punjab Union. The union has a pop. of 3,500,000 and an area of 10,000 sq. m. The inclusion of Patiala, at its ruler's request, was somewhat unexpected, as it might have been deemed large enough to retain its independence for the time being; but the fact that more than one-third of its people are S. explains this voluntary relinquishment. The Sikh community traditionally looked to the rulers of Patiala for guidance and advancement of its interests, and in the course of its hist. Patiala (q.v.) has played a prominent role. The total number of S. is about 5,500,000. See J. Malcolm, *Sketch of the Sikhs*, 1812; J. D. Cunningham, *History of the*

Sikhs, 1849; Gen. Sir C. Gough and A. D. Innes, *The Sikhs and the Sikh War*, 1897; M. A. Macauliffe, *The Sikh Religion*, 1909; and J. C. Archer, *The Sikhs in Relation to Hindus, Moslems, and Christians*, 1946.

Sikiang ('West River'), long riv. of S. China. The confluence of the two head-streams, the Yukiang or 'Right River,' which rises in N. Yunnan, and the Tsoukiang or 'Left River,' is in Kwangtung. The main direction is eastward till at Samshui its southward arm, the Canton R., enters the S. China Sea at the port of Canton. The S. provides access to the sea for the regions of S.W. China, and its wide delta offers a livelihood for hundreds of thousands of people, who spend their lives in junks on the riv., it being one of the world's most densely populated areas. Pirates frequently harbour their vessels in its creeks. Hong Kong stands on the E. deltaic arm. Length of main stream 1650 m.

Sikkim (Tibetan Dejong), fountatory Indian state (2818 sq. m. in area), lying on the south slopes of the Himalayas, wedged in between Chumbi, Bhutan, Bengal, and Nepal. Kangraha (16,000 ft.), Chola, and Jelep are high passes used for the transit trade between Tibet and Bengal. The Singalila range, 11,000 ft., the third highest mt. in the world, Kangchenjunga or Kanchenganga (28,146 ft.). The forests of S. are extensive. The main cultivation is of maize and rice, while fruit gardens are maintained by the state. Articles of trade are rice, maize, millets, cardamoms, apples, oranges, and woollen cloth. Beaten metal-ware of excellent workmanship is a native production. The pop. numbers 121,500 (1941), and consists mostly of Bhutias, Lepchas, and Nepalese, the latter predominating. The Lepchas (q.v.) were the original inhab. of S. They are an easy-going, non-materialistic primitive people, mostly still illiterate, and much dominated by the lamas. Polyandry is occasionally practised, and the sexual code of the Lepchas allows for great sexual promiscuity. Gangtok is the cap. The state religion is Buddhism, but the majority of the inhab. are Hindus. It is a tradition that the ancestors of the rajahs of S. came from E. Tibet. The state was invaded twice by the Ghurkhas in the eighteenth century. At the outbreak of the Nepal war in 1814 the Brit. formed an alliance with the rajah of S., and after the war some ter. was ceded to S. In 1835 the rajah of S. ceded the site of the present bn. of Darjeeling to the Brit. and received 12,000 rupees annually as payment for some fifteen years, when a punitive expedition was sent into S. owing to the imprisonment of Brit. officials by the rajah. Until the transfer of power in India in Aug. 1947, England controlled all foreign relations, and was represented by a political officer. In 1947 the Indian Constituent Assembly entered into negotiations with S. and meanwhile S. entered into an interim agreement with the Indian dominion. By this agreement the Indian Gov. sent a representative to stay at Gangtok, who is responsible for relations with S., Tibet, and Bhutan. The average ann. revenue of S. is about

5 laos. See J. C. White, *Sikkim and Bhutan*, 1909; Lord Ronaldshay, *Lands of the Thunderbolt*, 1923; J. Easton, *An Unfrequented Highway*, 1928; and G. Gover, *Himalayan Village: an Account of the Lepchas of Sikkim*, 1938.

Sikorski, Wladyslaw (1881-1943), Polish statesman and soldier, b. in Galicia, son of a gentleman farmer. He studied in Cracow and at the Lwow Technical College, proving a brilliant student. The outbreak of the world war in 1914 found Poland divided against itself, and when Pilsudski (q.v.) in Austrian Poland declared for the Central Empires, S. threw in his lot with the independence parties, and in 1917 organised a Polish Auxiliary Corps; but following the surrender of Russian Poland to Germany under the treaty of Brest-Litovsk, he was interned. At liberty again in 1918 he organised secret forces which fought the advancing Russian forces in 1919 in an undeclared war. S., in command of the 9th Div. of Infantry, played a prominent part in forcing a Russian retirement. But next year the Russians launched a strong counter-attack, advancing from the Iwina to Warsaw, north of which S., commanding the Polish Fifth Army, made a remarkably successful stand. In 1921 he was chief of the general staff and Prime Minister, restoring order and obtaining general recognition of the Russo-Polish line of demarcation. But after Pilsudski's *coup d'état* of 1926, he retired and for ten years lived in Paris, where he wrote sev. books of a military character which confirmed his reputation as a strategist. On the eve of the Ger. attack in 1939, when his offer of service was not accepted by Smigly-Rydz, he left Poland to build up a Polish Army abroad, and on Sept. 30 was nominated premier of the absentee Polish Gov. and commander-in-chief of all the Polish forces abroad. In 1940 he estab. his quarters in London as chief of the Polish general staff. Throughout he sought to maintain hope and leadership among the enslaved of Poland and to keep aflame the fire of Polish patriotism. Under his inspiration Polish infantry fought gallantly in the battle of France in 1940 and Polish airmen took a prominent part in the battle of Britain. He was killed in an aeroplane crash at Gibraltar in July 1943.

Sikorsky, Igor I. (b. 1889), Russo-Amer. aeronautical engineer, b. in Kiev, son of Ivan S., prof. of psychology at the univ. of St. Vladimir, Kiev, and educated at the naval academy, St. Peter-Lurg, and at the Polytechnic Institute, Kiev. He migrated to the U.S.A. in 1919 and was naturalised there in 1928. Early interested in aeroplane design, he constructed a helicopter in 1909, and built and flew the first successful four-engined aeroplane in 1913. S. produced sev. four-engined bombers for the Russian Gov. (1914-17). S. made the first successful and practical helicopter in the W. hemisphere (1939), and during later years until 1947 he designed sev. other types of successful helicopters which have been used by gov. and private organisations and were the

first and only helicopters used by the U.S.A. during the Second World War.

Silage, see HAY AND ENSILAGE.

Silay, tn. in the prov. of Negros Occidental, on the N.W. coast of Negros Is., Philippine Is., 10 m. N. of Bacolod. Pop. 25,000.

Silbury Hill, 1 m. south of Avebury, Wiltshire, England, is an enormous artificial mound, 130 ft. in height, with a surrounding ditch 20 ft. in depth. Shafts dug into it have not revealed a burial, and although its age and character are not known, it is generally accepted as a part of the great megalithic sanctuary of Avebury (see STONEHENGE). For a report on excavations there in 1922 see *Wiltshire Archaeological Magazine*, June 1923, xlii. 215-18.

Silchester, vil. 7 m. N. of Basingstoke, in Hampshire, England, is usually accepted as the site of *Calleva Atrebatum*, the cantonal cap. of the Atrebates, a Belgic tribe which inhabited a large dist. south of the middle Thames from Surrey to N.E. Wiltshire. The extensive walls of a polygonal-shaped Rom. tn. still remain, covering an area of some 100 ac., and there is a surrounding earthwork defence dating probably from the Claudian period (A.D. 43), and outside the walls an amphitheatre. The tn. plan was recovered by extensive excavation in 1890-1909, when the sites of the forum, basilica, inns, a tn. bath-house, a building, probably a Christian church, etc., were found; the excavations were filled in and most of the area is now under cultivation. The many relics found may be seen in Reading Museum. Further excavations were made 1938-39.

Silene, see CATCHFLY.

Silent Spirit, distilled spirit, nearly or quite destitute of flavour or odour, prepared from potatoes, damaged grain, molasses, etc. It contains over 90 per cent. of absolute alcohol, and is used in the manuf. of liquors and scents.

Silenus, in anc. classical mythology, a woodland deity or satyr with a reputation for song and prophecy. He was the companion of Dionysius, and always carried a wine-skin. He was the son of Hermes or of Pan, according to different versions of the myth. He took part in the contest with the Gigantes and slew Enceladus. He is represented commonly as a jovial old man, bald and puck-nosed, fat and round like his wine-bag, and generally intoxicated. Unable to trust his own legs, he is generally shown riding on an ass or supported by other satyrs. In other respects he is described as resembling his brethren in their proneness to wine, music, and sleep. S. is mentioned, with Marsyas and Olympus, as the inventor of the flute, and a special kind of dance was called after him, Silenus, while he himself is designated as the dancer. It is a peculiar feature in his character that he was an inspired prophet, and when in a drunken sleep mortals might compel him to prophecy and sing by girdling him with chains of flowers.

Silesia (Czech, *Slezsk*; Polish, *Śląsk*), region of E. Europe, about 17,400 sq. m. in

area. It is mainly lowland, drained by the Oder R., which crosses it from S.E. to N.W., but Schneekoppe in the Riesengebirge, which lies to the S.W., rises to 5280 ft. To the W. of this range rises the Isergebirge, whilst to the E. is the Eulengebirge. The Katzegebirge is a hilly ridge in the N.; in the W. are the R. Iser, Sprée, and Black Elster, all affluents of the Elbe, but more important are the Oder tribs., the Malapane, Glatzner, Nysa (Ger. Neisse), and Katzbach. S. is an extremely fertile region; before the Second World War Ger. S. was the chief supplier of cereals, cattle, poultry, eggs, vegetables, fruit, and sugar-beet for the whole of Germany, and flax, hops, and oil-plants were also cultivated. But mineral deposits are of prime importance; it is an area of rich coal-fields, and there is zinc ore in large quantities near Bytom (Ger. Buthen) and iron ore in the Opole (Ger. Oppeln) Region. Before the Second World War there were many coal, iron, and metal-smelting works, notably the huge smelting houses of Tarnowitz (Ger. Tarnowitz). There were great steel plants at Katowice (Ger. Kattowitz), chemical (nitrogen) works at Chorzow (Ger. Kaugshutte), and Ger. S. possessed also large glass, porcelain, earthenware, linen, and engineering industries.

Before the Bohemians conquered the area, in the tenth century, S. had already absorbed Celtic, Teutonic, Slav, Wendish, and Polish tribes. Bohemia encouraged Ger. immigration into S. These immigrants, chiefly from Thuringia and Bavaria, built S.'s civilisation, and founded most of her tns. and industries. Between the twelfth and eighteenth centuries S. was, at varying times, under Polish, Bohemian, and Austrian suzerainty, but from 1740 to 1745 Frederick II. of Prussia conquered it from Maria Theresa of Austria. In 1815 the Saxon dist. of Upper Lusatia was added to it, and until the First World War S. was the largest prov. of Prussia, being divided into Upper and Lower S. Agriculture was encouraged, mineral resources developed, and S. became one of the most progressive and flourishing areas in Europe. The majority of the pop. were now German, but she retained large Polish and Czech minorities, and by the treaty of Versailles, 1919, a part of E. S. was ceded to Poland and a portion of Upper S. to Czechoslovakia, while provision was made to allocate certain dists. in Upper S. by plebiscite. The result of this plebiscite, taken in March 1921, was in favour of Germany, but in spite of this decision a dist. of 1241 sq. m., with a pop. of nearly 900,000, was transferred to Poland, including the Slask (Cieszynski) (Ger. Teschen) area, rich in minerals. By a decree of Jan. 28, 1941, S. was divided once more by Hitler into the separate administrative provs. of Upper and Lower S., with respective caps. at Katowice and Wrocław (q.v.) (Ger. Breslau), thus restoring the pre-1919 position. Early in 1945 Marshal Koniew, having crossed the Silesian frontier, came to the bank of the

Oder near Wrocław on a front of nearly 40 m. So complete was the Ger. rout that it proved impossible for them to save both the Berlin area and the Upper Silesian coal-field. They abandoned the latter to Koniev, Gliwice being captured on Jan. 25 and Katowice on Jan. 28. Wrocław stood a nine-week siege and was almost entirely destroyed. Under the Potsdam Agreement, 1945, all of Ger. S. E. of the Oder passed to Poland, and the majority of its Ger. pop. was expelled without compensation. The inhab. of Ger. origin in Czech S., regained by Czechoslovakia in 1945, were also expelled. Altogether nearly 4,000,000 Silesians became refugees in W. Germany. Before the Second World War Ger. S. had a pop. of 3,400,000, Polish S. a pop. of 1,200,000 and Czech S. one of about 750,000; but the present pop. (1950) cannot be estimated. *See further under EASTERN FRONT or RUSSO-GERMAN CAMPAIGNS IN SECOND WORLD WAR.*
Silesian War, Third, see SEVEN YEARS WAR.

Silicium, Angelus (Johann Scheffler), see ANGELUS SILESIUM.

Silic, Silica, Silicates, Silicic Acid, see SILICON.

Silhouette Island, see under SEYCHELLES.
Silicon, non-metallic chemical element, symbol Si, atomic number 14, atomic weight 28.06. It does not occur in the uncombined state, but in combination with other elements it is, with the exception of oxygen, the most abundantly distributed of all the elements. As the dioxide, silica, it occurs as flint, sand, quartz, opal, chalcedony, etc. In combination with oxygen, and metals such as calcium, aluminium, magnesium, it occurs in clays and marls, and constitutes a large number of rocks. As prepared by heating fine sand and magnesium together, or by heating sodium in a stream of S. tetrachloride, S. is in the form of an amorphous brown powder (sp. gr. 2.15). Amorphous S. is soluble in alkalis with evolution of hydrogen, and burns in air and chlorine, forming the dioxide and tetrachloride respectively. When prepared in the presence of zinc or aluminium, S. forms long needle-shaped crystals (sp. gr. 2.4), which do not burn in oxygen, are very hard, and are used for scratching glass. Silica, or S. dioxide, occurs in nature in the amorphous form as opal, and in the diatomaceous deposits or 'kieselguhr' of Germany. It is formed when silicic acid is heated or by the action of an acid on sodium silicate. In the crystalline condition as quartz (hardness 7), silica forms prismatic crystals of the hexagonal system. As rock crystal, silica is occasionally cut and polished, and substituted as a gem for diamond. Tridymite is crystalline silica, which frequently forms twin crystals in trachytic rocks. At the temp. of the oxy-hydrogen flame, silica melts to a transparent viscous liquid which can be drawn out into fine threads that are extremely elastic and resistant, and are used by physicists in delicate instruments of precision. Silica is also used in the manuf. of silica-glass,

quartz-glass, vitreous, etc. Articles made of this glass will withstand sudden and extreme changes of temp. without cracking, owing to the very low coefficient of expansion of the substance. S. dioxide forms silicic acids of more or less definite constitution, and which are difficult to obtain pure. If hydrochloric acid is added to a solution of an alkaline silicate, a gelatinous precipitate is obtained of the dibasic acid, $\text{SiO}(\text{OH})_2$ or H_2SiO_3 . If, however, the alkaline silicate is cautiously added to the acid, the silicic acid remains in solution, probably as the orthosilicic acid, $\text{Si}(\text{HO})_4$ or H_4SiO_4 . The sodium chloride in the solution may be removed by dialysis (q.v.), but on standing the acid solution solidifies to a jelly of the approximate composition, H_2SiO_3 . The acid may be looked upon as the parent substance from which the silicates are derived. S. also forms a spontaneously inflammable hydride, and a fluoride which is decomposed on passing into water. Water-glass is a concentrated solution of sodium silicate; in preserving eggs it acts by clogging up the pores in the shells, thus preventing ingress of putrefactive bacteria. *See also FERRO-SILICON; IRON AND STEEL, Production of Steel.*

Silicon Bronze, alloy of silicon and copper, containing 3 to 5 per cent of the former, with small quantities of zinc, iron, and manganese. Where zinc is present in large quantity the more correct term is silicon brass. The alloys have a much greater strength than gun-metal, but casting is a more difficult operation.

Silicon Steel, see IRON AND STEEL, Production of Steel.

Silicosis, disease of the lungs, which affects workers who inhale flint or other mineral dust, as, for example, anthracite miners. Stone-masons, too, and potters are also especially susceptible to it. The tissue of the lungs becomes fibrous through continual small lesions and repair, and so less capable of aerating the blood and less resistant to tuberculosis. The risk of the disease is diminished by suitable ventilation, the use of exhaust fans, by spraying the air, and by respirators. *See also OCCUPATIONAL DISEASES.*

Silistria (Rom. Durostorum), city and the seat of an archbishop, on the Danube, 70 m. N.W. of Varna, in Rumania. Its commerce depends on such agric. pursuits as bee-keeping, viticulture, and the growing of corn and fruit. Pop. 17,000.

Silk and Sericulture. Silk is the thread produced by the silkworms, the larvae or caterpillars of numerous species of moth of the families Bombycidae (q.v.) and Saturniidae, both of which include a number of genera; but it is the genus *Bombyx*, and especially *B. mori*, which is of the chief industrial importance. The industry is of great age, and was confined to warm Asiatic countries until the sixth century, when it was introduced into Europe. Later, however, the production of S. in Europe has shown a considerable falling off, while the E., and particularly Japan, has increased its output. The world's production of raw S. in the five years before the Second World War, averaged

annually about 50,000 tons, and from Europe, principally Italy, only about one-tenth of the total was derived. Unless new methods are devised which would obviate the necessity for cheap labour employed for only a limited period of the year, the industry is not likely again to revive in Europe, and attempts to introduce it into America and Australia have for this and other reasons met with but little success. The only country in which the introduction of sericulture has prospered in recent years is Brazil.

The food of the larva of *B. mori* is the leaf of the mulberry, especially the white mulberry, and the cultivation of the silkworm is dependent on the supply of the leaves. On the low, moist, alluvial soils of the E. silps of this tree are planted in close and continuous lines, and six to eight weeks afterwards they are 6 ft. high, while the leaf-crop allows of six to ten broods being produced in the course of twelve months (multivoltine). In Europe it is not usual for more than one brood to be produced (monovoltine), and the female lays her eggs towards the end of the summer; but they do not hatch until the following spring, when the leaves appear. In Asia, during the season, the eggs hatch eight to ten days after laying. The caterpillar feeds persistently, and grows rapidly; at the end of a month it moults, and this happens four times in all before it starts to make its cocoon. The S. is produced from a spinneret in the head from which twin filaments emerge, joining to become what appears to be a single thread from 500 to 1000 yds. long. This the caterpillar wraps round its body until it is completely covered, and then it passes into the chrysalis state. Unless the grey moth is wanted for egg-laying, the chrysalis is killed by putting the cocoon in a hot oven, for if allowed to appear it cuts through some of the more valuable parts of the S. The so-called 'wild' S. of industrial importance are 'tasar' S. or 'tassar', produced by the larva of *Antheraea pernyi* and other species; 'muga,' produced by *A. yamamai* and by *Attacus cynthia*; and 'eri' S., produced by *A. ricini*, which feeds on the leaves of the castor plant, and is cultivated in Assam and other parts of India to a growing extent.

After the killing of the chrysalis by the application of heat, the first stage in the preparation of S. for the weaving process consists of the grading of cocoons as regards quality. Many methods are adopted for reeling the fibre from the cocoons, but the ancient, simple process, of the E. is still largely practised. The cocoons are contained in basins in water of temps. 140° to 160° F. They are gently whipped with twigs until the disengaged ends are caught, when three to five filaments are combined in one thread, the strands being 'encased' upon themselves to ensure cohesion. The utmost care is necessary in reeling to produce a thread free from knots or 'slubs.' The strands are then 'thrown,' a process analogous to spinning in the preparation of wool or cotton. In throwing sev. threads with little twist are used for 'tram,' or weft, and

with much twist for 'organzine,' or warp. S. are usually dyed in hanks, but they must be first deprived of their outer coating of gum. The fibre as reeled from the cocoon consists of a central portion of fibroin, whose composition is $C_{12}H_{12}O_5N_2$, and a peripheral coat of gum, which composes from 20 to 30 per cent of the whole. The gum is removed by subjecting the S. to treatment in two soap-and-water baths, the first at a medium temp. and the second at boiling point. Reeled S. so treated takes acid or basic dyes without mordant. See also ARTIFICIAL SILK. See L. de l'Arbousset, *Silk and the Silkworm*; J. Schober, *Silk and the Silk Industry*, 1927; F. Reinthal, *Artificial Silk* (Eng. trans. 1928); F. O. Howitt, *Bibliography of Silk*; W. Watson, *Textile Design and Colour*, 1937; and Lady Hart Dyke, *So Spins the Silkworm*, 1949.

Silk Trade.—Raw S. is produced chiefly in the Far E. Cultivation is carried on widely in Japan, China, and India, and to a lesser extent in Persia, Italy, and other southern and central European and Asiatic countries. Nine-tenths of the raw S. exported from Japan and China was (1939) absorbed into the Amer. S. trade. So-called 'wild' S. is also produced in N. China, India, and Japan. About 80 per cent of the S. available to international trade was (1931-39) produced in Japan, where it was one of the most valuable branches of agriculture, and an important item in the export trade; but a steady decline in output occurred after 1934. In 1938-39 the cocoon crop in Japan was estimated at 622,000,000 lb. (the lowest yield for many years) and the raw S. produced was about 86,700,000 lb. One explanation of this decline is that exports of cotton tissues have risen at the expense of raw S. exports. Production statistics are not available for China or India, both large producers. The production of S. cocoons in China is estimated at 3,500,000 piculs, of which 40 per cent is produced in the provs. of Kiangsu, Anhwei, and Chekiang. Raw S. exports of China in 1939 amounted to more than 10,000,000 lb. It is estimated that about 28,200,000 lb. of raw S. were produced in India in 1931-32. Italy is the chief European producer, but production has fluctuated in recent years. Korea and the Soviet Union are the only other important producers, output in Russia having steadily increased before the Second World War. The production of mulberry S. has long been estab. as an industry in Cyprus, but attempts to establish S. production in other Brit. colonies have not been successful owing to the decline in S. prices. Experiments with the Eri silkworm (*Attacus ricini*) introduced from India, which feeds on the castor-oil plant, have been carried out in the Gold Coast with a view to local weaving industries. This silkworm is also well known in Ceylon. World exports of raw S. showed on the whole a declining tendency in the decade before 1939. Exports from Japan were 73,500,000 lb. in 1931 and 1935, but in 1938-39 only 63,000,000 lb. owing to reduced Amer. consumption and smaller Jap. production.

Production of S. yarn in the United Kingdom more than doubled between 1930 and 1935. There was no further increase in 1937, but there was a decline in 1938. The Silk and Rayon Users' Association (Incorporated) (originally the Silk Association of Great Britain and Ireland) is the central organisation of the Brit. silk industry. Its headquarters are at 49 Park Lane, London, W.1, which is also the address of the S. centre. The association is well represented on the International Silk Association which was set up in 1948 to revive and stimulate world interest in the production and sale of S. goods. In the United Kingdom in 1937 the production of S. yarns was 5,820,000 lb. (Italy 6,000,000; France 3,900,000). S. manufs. constituted, before the Second World War, the largest item in Jap. exports to the United Kingdom, being valued at over £800,000. In 1931 78,700,000 lb. of raw S. were consumed in the U.S.A. A steady decline occurred until in 1937 only 56,300,000 lb. were used by industry. Raw S. consumption in America had been adversely affected during the depression years by its higher price as compared with other industrial fibres, and also by the increasing competition of the rayon industry, and in this connection the more recently produced 'nylon' fibre has also become a severe competitor, especially in the hosiery trade. The S. trade in France is encouraged by the gov., and is carried on in many depts., especially Gard, Drôme, Ardèche, and Vaucluse. In recent years production has declined (600,000 kilos in 1938), the number of producers falling from 67,526 in 1926 to only 11,000 in 1938.

Silk, Artificial, see ARTIFICIAL SILK.

Silk Cotton, short, silky fibre obtained from various tropical trees, particularly *Bombax malabaricum*, the silk-cotton tree, the large fruits of which contain pea-like seeds enveloped in the fibre. It is made into a coarse, loose cloth, but more commonly is used for stuffing mattresses and cushions.

Silk-tail, see WAXWING.

Silkworm, see SILK AND SERICULTURE.

Silkworm Gut, strong, fine cord prepared from the caterpillars of the silkworm, and used by anglers. The worms, when about to start spinning, are immersed in vinegar for 12 hrs., after which the silky secretion is exposed, on opening the caterpillars, as transparent glutinous threads. These are stretched and dried in the sun.

Silkworm Rot, see MUSCARDINE.

Sillanpää, Frans Emil (b. 1888), Finnish novelist, b. and brought up in the dist. of Hämeenkyrö, S.W. Finland, which is the scene of the majority of his novels. His father was a peasant, but despite his poverty he had a good education. His early training was for a scientific career, for which he studied at the Imperial Alexander Univ., Helsinki. He pub. his first novel at the age of twenty-eight, a love story entitled *Life and the Sun*. Since then he has written a number of novels and short stories, nearly all of which show his knowledge of peasant life and his sympathetic understanding of simple country people.

His second novel, *Hurskas Kurjuus*, dealing with the Finnish civil war, was pub. in 1919 (Eng. trans. *Meek Heritage*, 1938). Other novels which have been trans. into Eng. are *Nuoreni nukkunut* (1931; Eng. trans. *Fallen Asleep While Young*) and *Alchen tie* (1932; Eng. trans. *The Way of a Man*). S. was awarded the Nobel prize for literature in 1939. His reputation as the foremost of Finnish authors continued to grow, and the novel written during the Second World War, *Ihmisen ihmisen ja kurjuus* (*The Joy and Misery of Human Life*, 1945), is his best work.

Sillery, vil. in the dept. of Marne, France, 6 m. S.E. of Rheims, famous for its fine, dry champagne. Pop. 470.

Sillimanite, silicate of aluminium (Al_2SiO_5), similar in composition to cyanide.

Silloth, seaport tn. of Cumberland, England, on the Solway Firth, 22 m. W. of Carlisle. It has docks and a considerable trade. Pop. 2500.

Silo, see HAY AND ENSILAGE.

Siloam (O.T. Shiloah), reservoir close to Jerusalem, whence a tunnel was built by Hezekiah to bring water to the city.

Silone, Ignazio (b. 1900), pseudonym of Secondo Tranquilli, lt. novelist, b. at Pesina del Maris, near Rome. After visiting Russia in 1921 he ed. a Communist newspaper, but he left the Communist party in 1930 and lived in Switzerland until 1944. He then returned to Italy, and as a Socialist, ed. the paper *Avanti*. His knowledge and understanding of peasant life are shown in his novel *Fontanara* (1933) (Eng. trans. 1934). It is bitterly anticlerical, but the conflict between Christian and revolutionary idealism is portrayed with greater sympathy to the former in *Pane e vino* (1937), which was earlier pub. in England as *Bread and Wine* (1936). S.'s writing is distinguished by human understanding and sympathetic irony in the handling of his subjects.

Silphium, Compass Plant, or Rosin Plant (family Compositae), hardy perennials. The *S. laciniatum*, which grows 6 ft. high and has yellow flowers in summer, is interesting from its peculiarity while young of turning its leaves N. and S., and hence the name Compass Plant. Other species are *S. perfoliatum* (ronnatum) and *S. scaberina*.

Silures, powerful and warlike tribe of ant. Britons who offered a fierce resistance to the Rom. occupation (A.D. 48-78) in the border country of England and Wales. Venta Silurum (modern Caerwent) was their chief tn.

Silurian, third and highest of the component systems of the Protozoic rocks. It was originally known as the Upper S. of Murchison (see ORDOVICIAN), and its rocks were grouped by him into three main divs., Llandovery, Wenlock, and Ludlow. The typical Brit. area is that of Shropshire, where the rocks consist of mudstones and lime stones. The Llandovery div. is here made up of the Mayhill sandstone, the Pentamerus limestones, and the Taranon shales; the Wenlock div. by shales and limestone; and the Ludlow by shales, the Aymestry limestone, and the

Upper Ludlow beds, containing at its base the remarkable 'bone-bed.' The S. occurs in the areas of Woolhope, the Malvern, and Staffordshire, where the Dudley (Wenlock) limestone is very fossiliferous. In N. Wales the strata are represented by grits and shales of great thickness (Denbigh grits and flags 10,000 ft. thick). In Westmorland occur the Skelgill and Brown-gill shales (Llandovery), the Coniston grits and flags (Wenlock), and the Bannisdale slates and Kirkby Moor flags (Ludlow). The Scottish uplands are floored with the Greywacke type, which have been subdivided into the Birkhill, Gala, and Riecarton beds; while at Lismahagow representatives of the passage beds with eurypterids and fishes are found. In N. Europe the S. rocks are generally limestones and shales, as in Norway, central Sweden, Gothland, and Bohemia. In N. America the Llandovery is represented by sandstones and shales (Oneida and Medina), the Wenlocks by shales and limestone (Clinton and Niagara), and the Ludlow by three groups. The Salt group of Onondaga, the Waterlime, and the Helderberg limestones. The S. fauna includes fishes (Elasmobranchii and Osteocodermata), Crustacea (eurypterids), together with trilobites and phyllopora; Mollusca, Molluscolida, and Coelenterata are all represented. Of the S. flora little is known, but both lycopods and ferns are found. Economically the S. of Britain is of small importance, but in N. America the bedded iron ores of the Clinton series and the rock salt of the Onondaga series are of great value.

Silurist, see VAUGHAN, HENRY.

Silva, Antonio José da (1705-39), Portuguese dramatist, b. at Rio de Janeiro, was tortured by the Inquisition during his college days at Coimbra because he was a Jew, and finally suffered martyrdom for his religion. There is an 'Aristophanic wit' and a 'dramatic force' about his comedy, the *Guerras do Alcaim e Mangerona* (1737), which suggest that in S. the Holy Office robbed the world of a potential genius.

Silva y Figueroa, García de (1574-1628), Sp. diplomat and author, wrote a narrative of the customs and manners prevailing in Persia when he visited that country in 1618 on an embassy to Shah Abbas from Philip III., his king. The commercial treaty fell through, but his sidelights on the Persia of his day remain.

Silver. Symbol Ag, atomic number 47, atomic weight 107.88, a metallic element which occurs in nature in the free state and in combination. Native S. generally contains gold, copper, and other metals. Important ores are argentite (Ag_2S), pyrargyrite (ruby S. ore, Ag_3SbS_3), stephanite (Ag_3SbS_4), and horn S. (AgCl). Lead ores (galena) constitute one of the main supplies of S. Mexico and U.S.A. are the two great S.-producing countries, and yield about one-third of the world's output. The metallurgical processes for the extraction of the metal from its ores may be classified according as they are (1) amalgamation methods, (2) wet methods, (3) smelting methods.

Amalgamation Methods depend on the fact that mercury reduces certain compounds of S., and forms an amalgam with the liberated metal. In the Mexican (patio) process the crushed ore is ground fine with water and thoroughly mixed with common salt by the treading of mules. Mercury and 'magistral' (roasted pyrites consisting of crude sulphates of copper and iron) are then added and thoroughly incorporated. The amalgam formed is collected, washed, filtered through canvas bawls, and the S. obtained by distilling off the mercury. The salt and roasted pyrites combine to form ferric chloride, which then reacts thus: $\text{Ag}_2\text{S} + 2\text{FeCl}_3 = 2\text{AgCl} + 2\text{FeCl}_2 + \text{S}$, $\text{AgCl} + \text{Hg}_2 = \text{Hg}_2\text{Cl} + \text{Ag}$.

Wet Methods.—(1) Augustin's process for argentiferous copper mattes consists in roasting the crushed matte to expel sulphur, again grinding and roasting with salt to convert to the chloride. The chloride is dissolved in hot brine solution and the S. precipitated by copper. (2) In Ziegl's process the sulphides of argentiferous pyrites or copper mattes are oxidised to sulphates by roasting. Further roasting causes the formation of iron and copper oxides, and, by careful regulation of the process, S. sulphate, with a small proportion of sulphate of copper, is left with these oxides. The sulphates are leached out with water, and the S. precipitated from the solution by copper.

Cyanide Process.—The ore is mixed with water and ground into a slime, which is then mixed with sodium cyanide solution. Air oxidation follows, to convert any sodium sulphide to sulphate. Finally the sodium argentocyanide in solution is reduced to S. with zinc dust. The metal is removed and purified.

Smelting Methods.—The argentiferous ores are smelted with lead ores, and an alloy of S. and lead is obtained. If the alloy is rich in S. it is subjected to cupellation in a special cupel or furnace, the bed of which is composed of bone ash and pearl ash. During cupellation lead oxide (PbO) forms a scum on the surface of the molten metal and is blown off, while some of it is absorbed by the furnace bed. If too poor in S. to be directly cupelled, the alloy is concentrated by either Parkes's or Pattinson's process. Parkes's process depends upon the fact that when zinc is added to a melted alloy of lead and S. the zinc alloys with the S., rises to the surface, and can be readily removed as it solidifies before the molten lead. The operation is carried out in iron pots, and the zinc-S. alloy is skimmed off with a ladle, liquated, and finally distilled, and the residue of S. and lead is cupelled. Pattinson's process depends on the fact that S.-lead alloys have a lower melting point than pure lead. The operation is carried out in a row of iron pots, the alloy being melted in one and cooled by sprinkling water over the surface. The first formed crystals are ladled out with a perforated ladle and transferred to the next pot on one side. This operation is continued up to a certain point, and the residue transferred to the next pot on the other side. The other pots are similarly

treated, and so an alloy becoming richer in S. is sent in one direction, and purer and purer lead in the other. The rich alloy is then cupelled for the S.

A relatively large proportion of the new S. produced is obtained during the refining of other metals, such as copper and lead. Owing to its high value, S.-bearing scrap is carefully conserved and greatly contributes to available supplies of the metal. Such S. is usually refined electrolytically.

S. is a lustrous white metal (sp. gr. 10.5, melting point 961.5°C .), and is extremely malleable and ductile, being second only to gold. It has the highest conductivity for heat and electricity of all the metals. Molten S. absorbs twenty-two times its volume of oxygen, which it gives up again on solidification, causing the well-known 'spitting' of S. Three oxides of S. are known, the monoxide, peroxide, and suboxide. The monoxide is the most important, and is formed by addition of sodium hydroxide to a solution of a S. salt. It is a brown amorphous powder, soluble in strong ammonia, and is reduced to metallic S. on heating to 260°C . S. chloride is found native as 'horn S.', and is formed also when a soluble chloride is added to S. nitrate. The bromide and iodide are formed similarly by addition of soluble bromides and iodides to S. nitrate. These halogen salts are largely used in photography, since they blacken on exposure to light. The most important salt of S. is the nitrate, which is formed by dissolving the metal in nitric acid. It is a white crystalline substance (melting point 218°C .), and is used in medicine under the name of lunar caustic.

S. is semi-noble metal because of its considerable resistance to corrosion and is also of especially pleasing appearance and high reflectivity. It is unattacked by foodstuffs and fruit juices. For these reasons it has been used from ancient times for coinage and for domestic and ornamental articles. Pure S. alone being somewhat too soft for these purposes, an alloy containing 92.5 per cent Ag., 7.5 per cent Cu is used, and is known as sterling from O.E. *Sclorra*, star, with which some early Norman coins were marked. It is illegal to offer for sale articles which have not been assayed and 'hall marked' (see HALL MARKS) to confirm that the S. content is at least of this quality.

S. is also used as an electroplated coating on decorative and domestic articles which are often made from 'nickel S.', also called 'Ger. S.', an alloy of copper, nickel, and zinc which does not in fact contain S., hence E.P.N.S. (electroplated nickel S.) (see also SILVERSMITHS' WORK, *Sheffield Plate*). S. is also extensively employed in the electrical and chemical engineering industries and is a constituent of S. solders.

Silver Coinage.—Brit. S. coinage until 1921 was of sterling standard. In that year it was debased to 60 per cent Ag. The Brit. Gov. in 1946 introduced a new Coinage Bill, which provided that coins formerly struck in S. (with the exception

of maundy money) could thenceforth be struck in cupro-nickel. Technically the Bill did not abolish S. as coinage, but for all practical purposes meant that S. coins were to be replaced by cupro-nickel. The Bill received the royal assent on Nov. 6, 1946. The Gov's decision was founded on sound practical grounds, S. having become too expensive, especially as it had to be paid for in dollars. The domestic demand for S. had risen too, partly because of wartime requirements for coinage and partly because of the greatly increased use of S. for industrial purposes, especially in the electrical and photographic trades. Between the years 1939 and 1948 the Mint issued 1,290,000,000 S. and cupro-nickel coins with a value of £86,300,000. This ten years' output consumed 3000 tons of pure S., and by 1948 £140,000,000 of S. and cupro-nickel coin was in circulation, equivalent to 56s. a head of the pop., compared with 27s. 4d. a head in 1938. The present withdrawal of S. is not a calling-in of coin, but a replacement. The Mint accepts S. and gives in exchange cupro-nickel. The exchange is profitable, as each £100 received by the Mint contains S. to the value of £33, while the £100 cupro-nickel given in exchange has an intrinsic value of perhaps £4. The total net profit from the replacement may in time exceed £30,000,000, but much depends on the future price of S. S. coin remains legal tender up to 40s. provided that it is not dated prior to 1816. It will be at least twenty years before the present S. coinage has been substantially withdrawn.

Silverdale, dist. of Newcastle-under-Lyme (q.v.), England.

Silver-fish, see *APTERYGOTA*, or *APTERA*.

Silver Glance, see *ARGENTITE*.

Silversmiths' Work. Among ancient races the art of working gold or silver, either by hammering or by casting, reached a remarkably high degree of skill, the more so considering the crude means available. The attractive colour of these metals, their resistance to corrosion, by which they outlast other metals, their readiness to take shape under the hammer (malleability) or, when cast, their ductility when drawn into wire, coupled with the high polish obtainable—these qualities commended them to craftsmen in all ages. Scarcity alone limited their employment. Sumerian work proves their craftsmanship, and Egyptian tombs have revealed an equal skill in gold and silversmithing. The famous gold cups of Vaphio, found in Crete, speak of Mycenaean civilisation, 1800–1100 B.C., and the command they show of modelling animals or the human figure in low relief continued through the Gk. and Rom. ages. The Mildenhall treasure, found in 1942 in Suffolk and judged to be Rom. work of A.D. 300–400, comprised trays, dishes, goblets, spoons, and bowls. Silversmiths in the Byzantine era imparted colour to their silver by enamelling, and the art, carried westwards, reached Britain through France.

The Church was the chief patron (e.g. Dolkely chalice, thirteenth century), but domestic use, by royalty and nobles,

began to increase (e.g. Studley bowl with engraved alphabet, late fourteenth century). With Tudor silver, splendour at the table was achieved. Thereafter foreign influences like the work of the Nuremberg silversmiths or the complete change in style promoted by the Renaissance, reached Britain. The Gothic style was abandoned and Greek motifs e.g. Corinthian capitals provided ornaments. With the Restoration came the Dutch influence and tulips in repoussé decorated cups and salvers. The phase of chinoiserie with engraved landscapes led to the simplicity of the William and Mary period and Queen Anne gave



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HAND MADE SILVER COFFIN LOT
by Leslie Durbin

her name to a style that had a vogue both before and after her reign (1702-1714). With the arrival of the Huguenot refugees the florid style associated with the name of Louis XIV became the taste of the day and simplicity ceased to appeal. From that time it may be said not to have returned until recent decades. When ancient Roman work was unearthed at Herculaneum and Pompeii a revived interest in classic art followed and the Adam style was the result. During the Victorian era silver became ostentations, a symbol of wealth and not till George V did signs of a modern school develop. More attention is now given to design than formerly.

The silversmith for the last 600 years, has been rigidly controlled in the quality of his metal (see HALL MARKS). Sterling silver has throughout been the standard, except when an alloy of higher silver content (Britannia silver) was enforced. The first systematic use of a substitute for silver was the invention of Sheffield plate, by Thomas Boulsover in 1742, upon a

sheet of copper he fused a thin sheet of silver, at first on one side only, then on both. This sheet was then worked into the forms current in silverware. Since the copper showed at the edges special mouldings, called mounts were soldered on. Both in cost and through being largely struck from dies, Sheffield Plate offered serious competition to silversmiths. The subsequent invention of electroplating (1840), for the same reasons, enabled many more people to purchase 'silver' domestic ware, the centres for this manufacture being Birmingham and Sheffield. The same factories produce silverware and in addition London silversmiths have retained the hand methods of tradition and produce the higher grade of article. Located there is the design and research centre for the gold, silver, and jewellery industries. Abroad silver is made in Paris, Brussels, Copenhagen, Stockholm, Schaffhausen in Switzerland, The Hague, and, in a lesser degree in most capital cities. The American industry in the U.S.A. is quite extensive.

See Sir C. L. Jackson, *English Goldsmiths a Their Work 1900* and *Illustrated History of English Gold 1911*. N. Dawson, *Goldsmiths and Silversmiths Work*, 1907. W. W. Watts, *Old English Silver*, 1924. W. J. C. G. *Old Silver of Europe and America 1128-1700*. W. H. W. *Domestic Silver of Great Britain and Ireland 1931* and *Old Silver in Museum Settings 1941*. C. C. *Our English Domestic Silver 1331-1947*, Victoria and Albert Museum. Charles II, *Domestic Silver Tudor Domestic Silver English Silver from Charles II to the Regency*.

Silver State, see COLORADO

Silver Thaw, unscientific term for deposits of ice on surface objects including frozen dew, hair frost, rime (r) and glazed frost particularly when only a thin covering of ice is present. It is not a truly a thaw. Frozen dew and hair frost are formed by radiation cooling during clear nights the first condensation taking place above freezing temps in the former and below freezing in the latter. Rime is formed in supercooled liquid fogs. Glazed frost is formed when rain falls through freezing layers of air which cool the raindrops to below freezing but without forming ice until the raindrop hits a solid object. Glazed frost is comparatively rare in Britain (long better known in continental climates). Much damage is caused (as in 1940 and 1947) when the accumulation of ice is sufficient to break down telegraph wires, twigs, branches and even in exceptional circumstances whole trees. An occurrence in London and other parts of England on Dec. 21, 1927 caused six thousand street accidents.

Silverton, tn and centre for silver and copper mining etc. situated in a desert, 300 m from Adelaide in New S. Wales. Pop. 500.

Silvertown, industrial suburb of E. London, in the corridor of W. Ham S. of the Victoria and Albert Docks (between the m and the Thames) in Essex, England. On Jan. 10, 1917 there was a heavy

explosion at a munitions factory in S. Sixty-nine people were killed, some 400 others injured, and sev. industrial works totally demolished.

Silves, city in the dist. of Faro, S. Portugal, on the R. Silves, 30 m. W.N.W. of Faro; it has numerous Moorish remains. Pop. 12,000.

Silvester, name of two popes and two anti-popes:

Silvester I. (*St. Silvester*) (d. 335), said to have been son of one Rufinus. The *Liber Pontificalis* gives his mother's name as Justa. On the death of Miltiades (or Melchisedes), S. became pope in 314. This was in the time of Constantine the Great, with whom S. was associated in much unhistoric legend, especially that contained in the *Vita Beati Silvestri*, which appeared in the sixth century. Catholic authority disavows the stories of the persecution of S., the healing and baptism of Constantine, Constantine's gifts, the rights he granted to S., and the council of 275 bishops. However, S. did take part in the negotiations with the Arians, and sent two legates to the Council of Nicea. Also, his pontificate was marked by the building in Rome of the basilica and baptistry of the Lateran, the basilica of Santa Croce, St. Peter's in the Vatican, and sev. churches over the graves of ... Parts of the church of Equitius probably date from the time of S., who was specially connected with its foundation. He was buried in a church built over the catacomb of Priscilla. His chair is preserved in the cloister of the Vatican. His day is Dec. 31.

Silvester II. (Gerbert d'Aurillac), Fr. Benedictine. He was enthroned pope on April 2, 999. He obtained from the emperor on his accession letters attesting the temporal power of the Holy See. S. II. or Gerbert has left many writings, and was a man of much learning.

Silvester III. (John, bishop of Salona), antipope, set up in 1044 by a party of nobles owing to the outrageous conduct of Benedict IX., who fled. After seven weeks he returned, and with the aid of troops from Tusculum S. was driven out. On May 1, 1045, Benedict resigned and John Gratian became pope as Gregory VI. S. was degraded at the synod of Sutro on Dec. 20, 1046.

Silvester IV., anti-pope, was raised to the papacy by the imperial party in place of Paschal II., 1105. He made his submission to Paschal II. in 1111.

Silvester Gozzolini (1177-1267). Itaint, b. at Osimo. In 1231, after receiving a vision of St. Benedict, he instituted a new congregation of Benedictines, known as Blue Benedictines, from the colour of their habit, which he governed for thirty-six years. It was approved by the pope in 1247. S. represents the new growth of Benedictinism in Italy, which coincided with the foundation of the new orders of friars. He was canonised in 1598.

Simnab Cedron, see CEDRON.

Simancas (Rom. *Septimancia*), tn. in the prov., and 8 m. S.W., of Valladolid, Spain, on the R. Pisuerga. The national archives have been kept in its citadel since 1563. Pop. 1100.

Siman Kalat, ruined city of N. Syria, about 25 m. N.W. of Aleppo. The church of St. Simcon (460-560) is one of the best examples of Christian Syrian architecture, showing Byzantine influence.

Simarubaceae, family of trees and shrubs with axillary or terminal peduncles of small white, green, or purple flowers, followed by fruits. Among the genera are *Simaruba* and *Quassia* and all are intensely bitter plants.

Simbirsk, see ULIANOV.

Simcoe, Lake, Ontario, Canada, between Lake Ontario and Georgian Bay. It is 30 m. long by 18 m. broad, and discharges itself into Lake Huron through the Severn R. There is a tn. of the same name, cap. of Norfolk co. Pop. 6000.

Simenon, Georges (b. 1903), Belgian novelist, b. at Liège, emigrated to the U.S.A. before the Second World War. His detective and other novels, which have been trans. into many languages, are notable for their portrayal of criminal and unbalanced characters and for their descriptions of middle-class life in Fr. prov. tns.

Simeon, one of the tribes of Israel, deriving its descent from S., the second son of Jacob and Leah. It played an important part in the conquest of Canaan and it received the ter. to the S. of Judah. It was almost extinguished in the wars against the Philistines.

Simeon, Charles (1759-1836), Eng. divine, b. at Reading, and educated at Eton and King's College, Cambridge. After being elected a fellow of King's he was ordained, and in 1783 became perpetual curate of Holy Trinity, Cambridge. He was one of the leaders of the evangelical party in the Church of England, and exercised great influence at his univ. S. was one of the founders of the Church Missionary Society, and estab. the S. Trust to provide livings for evangelical clergy.

Simeon, or Symeon, of Durham (c. 1070-c. 1150), Eng. chronicler. He was the author of *Historia Ecclesie Dunelmensis* (first printed 1732), the MS. of which is preserved in the library of Bishop Cosin, and of *Historia Regum Anglorum et Danorum*. See ed. of Thomas Arnold (Rolls series, 1882-85).

Simeon Stylites, see STYLITES.

Simeon, The Song of, see NUNC DIMITTIS.

Simieropol, cap. of the Crimean Region of the R.S.F.S.R., lies in S.W. Crimea, Russia, and is delightfully situated on the N. ridges of the Chatyr-Dagh Mts., 78 m. by rail N.E. of Sevastopol. The seat of an Orthodox Gk. bishop, it is noted for its gardens and vineyards, and there are candle, soap, and tobacco factories. It was occupied by the Gers. on Oct. 31, 1941, but recaptured by the Russians in April 1944. Pop. 112,600.

Simia satyrus, see ORANG OUTAN.

Simile (neuter of the Lat. adjective *similis*, like), figure of speech by means of which a statement is made of 'some point of resemblance' received to exist between two things which differ in other respects. 'Thy soul was like a star and dwelt apart' is an illustration of S.

Simla, dist. and tn. in the E. Punjab, India. The dist. has an area of 101 sq. m. Its surface is diversified by outlying spurs of the E. Himalayas, and includes Chor, a mt. 11,982 ft. high. The chief rvs. are the Sutlej, Pabar, and Giri, and among the nineteen S. Hill States (part of the Himalachel Pradesh after 1948) are Jubbah, Keonthal, and Hashahr. Pop. 38,500; of S. Hill States 460,000. The tn., which is beautifully situated at a height varying from 6500 to 8000 ft. above the sea, lies 170 m. N. of Delhi. Before the transfer of power in 1947 it was the summer headquarters of the viceroy and the gov., and is now that of the governor-general, and has many imposing public structures, such as the gov. buildings, United Service Institution, etc. Fruits and shawl-wool are exported. Prior to 1819 the site was unoccupied. Pop. 25,000 in winter, and about 92,000 in summer.

Simms, William Gilmore (1806-70), Amer. man of letters of Irish descent, b. at Charleston, South Carolina. He studied law there and was admitted to the bar in 1827. S. was the author of a poem, *Atlantis*, and sev. historical romances including *The Yemassee* (1835), *Mellichampe* (1836), and *Beauchampe* (1842). Of these *The Yemassee* is the most important, giving an account of a campaign which is otherwise virtually unknown, and dealing largely with Indian character and nature. His revolutionary romances depict social life at Charleston, and their action extends over the whole revolutionary period, with faithful portraits of the political as military leaders of the time. S. handled the theme of warfare with interest and real power; in other spheres he is fulsome and sentimental.

Simmel, Lambert (fl. 1477-1534), Eng. impostor, son of an Oxford joiner. As a tool in the hands of an Oxford priest, Richard Symonds, he was put forward to impersonate Edward, the young earl of Warwick, son of George, Duke of Clarence, who it was believed had died in the Tower. Symonds dispatched S. to Ireland, where in the cathedral in Dublin he was crowned (May 21, 1487). The conspiracy having been discovered by Henry VII., Warwick was shown to the London public; meanwhile an armed force from Ireland, under the command of Sir Thomas Fitzgerald, landed in Lancashire, and marching upon the royal army, attacked the Royalists near Stoke-on-Trent (June 16, 1487), where the battle took place in which the Royalists were victorious, and S. and the priest made prisoners. It is said that S. was then made execution in the king's kitchen.

Simois, riv. of Troas in Asia Minor, renowned because of the Homeric battles fought near its banks.

Simon de Brise, see MARTIN (popes), Martin IV.

Simon, Sir John (1816-1904), Eng. surgeon and sanitary reformer, the grandson of Fr. Emigres. In 1847 he became surgeon and lecturer on pathology at St. Thomas's Hospital, and the following year he was appointed medical officer of health to the city of London, being the first to occupy that post. He held this appointment from

1848 to 1855, and his reports are still referred to as classics of health administration and preventive medicine. In 1855 he was appointed medical officer to the Central Board of Health and, in 1858, he became medical officer to the Privy Council, which had taken over the duties of the board. On the formation of the Local Government Board in 1871 he became its first medical officer, but in 1876 he resigned after disagreements with the administrative staff, after seeing the passing of the Public Health Act, 1875. He was also largely responsible for the Medical Act of 1858, introduced 'to regulate the qualifications of practitioners in medicine and surgery,' and for the formation of the General Medical Council, which was created by that Act. In his day he pressed for the appointment of a minister of health, though that ministry was not created until 1919. His labours in sanitary science directed its whole development so that in England it attained the highest degree of excellence, and afforded an example to the rest of the world.

Simon Maccabaeus, Jewish high priest, one of the five brothers who fought the great fight against Syria for the freedom of Palestine. From the first year of his pontificate (141 B.C.) a new era was counted. See JEWS.

Simon Magus (fl. c. A.D. 37), character mentioned in the N.T. He was a Magician (Magus) who became a Christian and offered Peter money in exchange for the power of working miracles; hence the word 'simony.' The N.T. account in Acts viii. 5-24, tells that he had proclaimed himself as 'some great one,' and had a large following. Second-century Christian literature contains much legendary matter about him, of which the only certain fact seems to be that he was Gnostic in his teaching. The main are Justin Martyr, *Apology* I. xxvi, and lvi, and Irenaeus, *Against the Heretics* I, xxi. See also SIMONY.

Simon of Stockpole Elidor, Sir John Allsebrook, first Viscount (b. 1873), Eng. statesman, b. at Bath and educated at Fettes and Wadham College, Oxford. He became a fellow of All Souls College, Oxford; and in 1896 presided over the Oxford Union. Three years later he was called to the Bar. In 1903 he was one of the Brit. counsel in the Alaska-Canadian boundary dispute. Entering Parliament as a Liberal in 1906, he supported Sir Rufus Isaacs in defending the finance of the Home Rule Bill, 1912. Appointed solicitor-general in 1910, he took part in the *Titanic* inquiry, 1912; in the same year he was made a privy councillor. His appointment as solicitor-general in the long and memorable Asquith administration, followed by his promotion, after Sir Rufus Isaacs became Lord Chief Justice, in 1913, to attorney-general and a post in the Cabinet, seemed to mark him out as the next lord chancellor. When the First World War broke out he all but resigned, being, like John Morley, a very high-principled Victorian Radical, but the appeal of Belgium decided him to remain a member

of the War Gov., and when the first Coalition Gov. was formed in May 1915, he was offered the Woodsack, but chose to occupy the Home Office rather than close the avenue to still greater office. In those days there existed a convention that a lord chancellor was thereafter ineligible for any other post. The course of political events, however, was for a long time against S. When during the war conscription was suggested, and Asquith accepted it in principle, S. resigned, an act which was opposed to the views of the vast majority of the people, and which required high moral courage. For many months afterwards he served with the forces in France, taking a commission in the Royal Flying Corps.

S., after serving on the Royal Commission on the univs. of Oxford and Cambridge (1921), returned to Parliament in 1922 as Independent (Asquith) Liberal for Speen Valley, Yorkshire. He was head of the Statutory Commission on India (1927-30). The commission's report was shelved, and in order to placate the leaders of the conference, the gov. excluded S. from its sittings. Prior to this work, S. denounced the general strike of 1926, the illegality of which he exposed in the most convincing manner. The political tide, however, did not again turn in his favour until 1931, when the Labour Prime Minister, faced by a grave financial crisis, was compelled to turn to the ablest men regardless of party ties. In these circumstances, S. took office in Nov. 1931 as secretary of state for foreign affairs, in Ramsay MacDonald's National Gov., his first Cabinet post since the First World War. The Liberal party broke up over the questions of free trade and the Ottawa agreements in 1931. The National Liberals, under S., supported the gov., but the Liberal Nationals, led by Sir Herbert Samuel, left the gov. After the invasion of Ethiopia S. left the Foreign Office to become home secretary, 1935-37, and became chancellor of the Exchequer in 1937. From 1935 to 1940 he was deputy leader of the House of Commons. He became lord chancellor in the National Gov. in 1940, and in that year was created a viscount. In the 'caretaker' gov. of 1945 he continued as lord chancellor, fully supporting Churchill's administration, and went into opposition after the general election later that year.

Simon of St. Quentin (fl. thirteenth century), historian of the Dominican expedition led by Ascelin (or Anselm) and sent by Innocent IV. in 1247 to the Tatars. His hist. is not extant, but large sections of it are quoted in Vincent of Beauvais's *Speculum Historiale* (194). He accompanied the expedition to Siltens in Armonia, where the Dominicans behaved so haughtily toward the Tatars that they narrowly escaped death. They were sent back with a defiant message, their only success being as explorers.

Simon of Siena, see 'MEMMI' SIMONE. **Simon Stock** (d. 1265), Eng. saint, b. at Aylesford, Kent. He became a Carmelite and, in 1247, sixth general of the order. In this position he estab. houses in the

prin. univ. cities of Europe (Cambridge, 1248; Oxford, 1253; Paris, 1260; Bologna, 1260) and modified the rule, making the Carmelites an order of mendicant friars, instead of a hermit order. S. was never formally canonised, but is venerated by the Rom. Catholic Church as a canonised saint.

Simon of Wythenshawe, Ernest Darwin Simon, first Baron (b. 1879), Eng. local government expert, b. at Manchester, of which city he was lord mayor in 1921. Member of the Manchester City Council from 1924 to 1933, and of Manchester Univ. Council 1929. He entered Parliament as a Liberal in 1923, and in 1931 became parl. secretary to the minister of health. An authority on housing of the working classes and slum clearance and improvement schemes, he was also a member of the dept. committee on the valuation of dwelling houses, 1933. In 1946 he joined the Labour party; the next year he was raised to the peerage, and in June 1947 he became chairman of the B.B.C. Pubs.: *A Hundred Years of City Government (Manchester 1835-1935)*, 1938, and various pamphlets on education and rating questions.

Simone Martini, see 'MEMMI' SIMONE.

Simonides of Amorgos (fl. 650 B.C.), Gk. lyric poet, b. at Samos, founded a colony on the is. of Amorgos. About thirty fragments of his poems remain, of which the largest is one on the *Pedigree of Women*. See T. Bergk, *Poetie lyrici Graeci*, 1877-82, and ed. of P. Maury, 1900.

Simonides of Ceos (c. 556-495 B.C.), Gk. lyric poet, b. at Iulis, in Ceos. He settled in Athens, from where he withdrew for a time to Thessaly. He wrote elegies, dirges, epigrams, odes, and Bacchic songs of the highest lyric quality. See T. Bergk, *Poetie lyrici Graeci*, 1877-82; H. W. Smyth, *Greek Melic Poets*, 1909; and J. A. Symonds (trans.), in his *Studies on the Greek Poets*, 1873-76.

Simonoseki, see SIMONOSEKI.

Simonstown, tn. and Brit. naval station, Cape Prov., S. Africa, on False Bay, 23 m. south of Cape Town. It has extensive docks, which were opened by the duke of Connaught in 1910. In 1922 the Union Gov. agreed to take responsibility for the maintenance and manning of the forts commanding it. The Nationalist opposition in South Africa, before the Second World War, proposed to protect South African neutrality by the outright cession of S. 'as another Gibraltar.' Hertzog (q.v.) claimed, from the standpoint of international law, that there was no difference in principle between Simonstown and Gibraltar, and that if the Union claimed neutrality S. could be treated as foreign ter. But in 1935 his views coincided with Gen. Smuts's declaration in 1928 that 'the great sheet-anchor of South Africa's liberty is the British fleet.' Pop. 5000 (nearly half of whom are whites).

Simony, buying or selling for money, or other corrupt consideration, any eccles. benefice, dignity, or preferment, or causing a clerk to obtain or to relinquish such benefice or preferment for corrupt consideration. The 40th canon of 1603 deals

with the subject, and in common law the offence depends upon 31 Elizabeth, c. 6. The word is derived from Simon Magus (q.v.), mentioned in Acts viii. 18-24 as having offered money to Peter and John that he might obtain the spiritual power possessed by the Apostles.

Simoom, or **Simoon** (Arabic *samum*, from *samm*, poisoning), hot and stifling wind which sweeps over the deserts of Syria, Africa, and Arabia. Convectional eddies are often set up by the intensely heated desert forming dustdevils and sandstorms.

Simplicius (d. A.D. 483), pope from 468. During his pontificate many eccles. difficulties arose from the Monophysite party in the E., and Italy was invaded by barbarians led by King Odoacer.

Simplified Spelling. The proposal to simplify Eng. spelling has been broached from time to time ever since spelling achieved uniformity in large measure in the sixteenth century. Societies have been formed for the purpose, and innumerable improvements, most of them in the form of logical modifications, have been suggested.

Any attempt to 'simplify' Eng. is limited by certain fundamental facts: (1) the vocabulary of the language consists of over 400,000 words (the *Oxford Dictionary*, without the supplementary vol., contains a total of 414,825); (2) although Eng. is based on A.-S. (itself a dead language) it includes, apart from those of Gk. and Lat. origin, words drawn from many other languages, e.g. Fr. (*hotel*), Ger. (*Kindergarten*), Chinese (*tea*), Portuguese (*marmalade*), Malay (*gong*), Dutch (*yacht*), Arabic (*coffee*), Heb. (*amen*), Persian (*ilac*), Turkish (*tulip*). While words so borrowed are not always pronounced as they are in the countries of their origin, they are usually spelt in the same way. More words of this nature are constantly being added to the language; (3) the pronunciation of Eng. words by the Eng., to say nothing of foreign importations, is constantly in a state of flux; (4) the Eng. alphabet is utterly incapable of conveying the sounds used. There are twenty-six letters. Of these, three (c, q, and z) are superfluous, as they can be otherwise represented; c by k if hard and by s if a sibilant; q by kw; z by ks. Of the twenty-three remaining, three are permanently vowels, while y can be used as either a vowel or a consonant, and w as a consonant (as in *wc*) and in combination with a vowel (as in *ewe*). The remaining sixteen are consonants. (Two extremely useful Saxon symbols for the sound *th* were eliminated after the Norman Conquest, as the tongues of the invaders were incapable of grappling with it.) This meagre and somewhat illogical collection represents the total means for expressing Eng., simplified or otherwise. Any alterations in spelling on a large scale would involve an upheaval justifiable only if such alteration possessed at least three positive virtues. It would have to be strictly consistent, it would have to be simple, and it would have to meet with general acceptance.

Many reformers, aware of these handicaps, are willing to compromise, and make only minor simplifications. Minor modifications, however, have been occurring for centuries. In the seventeenth century Daniel Defoe was eliminating the *l* from *should*, *would*, and *could* by substituting an apostrophe, *sho'd*, etc. Strangely enough, numbers of such simplifications later disappeared, to be replaced by the old forms. Two examples may be given: (1) the use of the apotrope in the past tenses of verbs where the *-ed* was not intended to be pronounced as a separate syllable (*resolv'd*, *harm'd*); (2) the spelling of *farewell* with only one *l*. On the other hand, the once-universal *k* at the end of words like *arithmetic* and *critic*, and the second *l* in *until* have been dropped and *f* has been substituted for *ph* in *frenzy*. *Murderd*, too, was originally written *murtherd*, and *epistle*, *epistle*. Amer. spelling contains a number of simplifications not found in England, such as the absence of *u* in *favor*, *color*, *honor*, and similar our endings, this simpler spelling being a survival from the Elizabethan form.

One school of Eng. spelling reformers, including Prof. Follick, have suggested that if phonetic spelling is impracticable because of the limitations of the Eng. alphabet, all vowels with identical vowel sounds should be written with the same vowel, e.g. *air* should also be the spelling for *ere*, *e'er*, *heir*, and *lyr*. This 'automatic spelling' is opposed on the grounds that words can change their vowel sounds, e.g. *soot* has in different centuries and localities rhymed with *boat*, *cut*, and *put*; *tea* in the eighteenth century was (correctly) pronounced *tay*. Automatic spelling would therefore need reviewing periodically.

The same objection applies to 'phonetic spelling,' as advocated by Bernard Shaw. This simplification is based to a far larger extent on pronunciation. Thus *bomb* becomes *bom*. Melvil Dewey compiled his *Decimal Classification and Relative Index* entirely in this system. His reasons for its adoption were that the old forms (1) wasted space and therefore money; (2) confused children and wasted time; (3) were illogical, and, by their inconsistency, prevented Eng. from becoming a world language. *School* becomes *skool*; *shelvs*, *shelrs*; and *psychology*, *sykolodjy*. S. S. on this principle has been adopted in the Netherlands. In 1946, after many years of discussion by a Dutch-Belgian committee of linguists, spelling reformers, basing Dutch and Flemish almost entirely on pronunciation, were sanctioned by both govs. Since 1591 Dr. Kollwijn had been advocating such a reform. The prin. changes were (1) *e* and *o* were to be written singly in an open syllable, e.g. *bomen* (trees) instead of *boemen*; (2) *s* was to be written instead of *sch* when the *ch* was not pronounced, e.g. *vis* (fish) instead of *mack*; (3) the last but one form of declination was abolished, i.e. *de* (the) was to be written instead of *den* (the) for masculine words in the singular and as the object of the sentence. A third group of reformers propose an even more drastic

change. P. D. Ridge-Beedle in *Why Not English?* has advocated a simplification involving a new alphabet. This is fully phonetic. He argues that while this system might take longer to impose it would, once estab. be the easiest, most logical, and most economical.

Opposers of S. S. claim that reforms in spelling can only be applied to a static language, i.e. one that is dead, or moribund. But the Dutch experiment would appear to shatter this argument.

Simplon Pass, Swiss Alpine pass, 6592 ft. above the sea, is crossed by the Simplon road, built at the orders of Napoleon between 1800 and 1807. The pass begins from Brig, in the Swiss canton of Valais, and winds up and then down, over 600 bridges and through many rock-pierced tunnels, to Domodossola in It. Piedmont. The distance is 41 m. The railway tunnel, extending from Brig to Iselle, was opened in 1906. It is 12½ m. long.

Simpson, Sir George Clarke (b. 1878), Brit. meteorologist, b. at Derby, educated at the Diocesan School there and at Gottingen Univ. He became a fellow of Manchester Univ. in 1901 and was 1851 exhibition scholar, 1902-5. In 1903-4 he investigated the electrical state of the atmosphere in Iceland, joined the Meteorological Office, London, as a scientific assistant in 1905, lectured on meteorology at Manchester Univ., 1905-6, and was Imperial Meteorologist India from 1906 to 1920. He was meteorologist to the Brit. Antarctic expedition, 1910-12 and wrote on atmospheric electricity, terrestrial radiation, and ice-ages. S. was director of the Meteorological Office from 1920 to 1938; president of section A (Mathematics and Physics) of the Brit. Association, 1925. He was awarded the Symonds gold medal by the Royal Meteorological Society (1930) of which body he was president from 1910 to 1912. F.R.S. (1915); K.C.B. (1931).

Simpson, Sir James Young (1811-70), Scottish doctor, b. at Bathgate, graduated in medicine at Edinburgh Univ., and was president of the Royal Medical Society in 1835. He specialised in obstetrics and in 1817 introduced chloroform. S. pub. many books and papers on obstetrics, anaesthesia, homeopathy, cholera, leprosy, etc. He was made a baronet, 1866. See H. L. Gordon, *Simpson and Chloroform*, 1897.

Simpson's Rule. To find the area enclosed by a curve, divide it into an even number of parts by an odd number of equidistant ordinates including the first and last. Number the ordinates in order; then the area will be the sum of the first and last ordinates, plus twice the sum of the other odd ordinates, plus four times the sum of the even ordinates, the total being multiplied by one-third the distance between one ordinate and the next.

Sims, James Marion (1813-83), Amer. surgeon and gynecologist, b. in Lancaster dist., S. Carolina, educated at Jefferson Medical College, Philadelphia, where he graduated in 1835. He is remembered particularly for his invention of the 'duck-

billed' vaginal speculum (originally a bent spoon) named after him, which permitted an unobstructed view of the vaginal lining. The use of this speculum enabled S. to perfect an operation for the troublesome condition of vesico-vaginal fistula (i.e. a connection between the bladder and the vagina). He also devised a method of amputating the cervix uteri (neck of the womb). A statue to his memory was erected in Bryant Park, New York, in 1891.

Simson, Lady, see ASHWELL, LENA.

Simson, Robert (1687-1768), Scottish mathematician, b. in Ayrshire. Having studied in Gila-gow and London, he was, in 1711, appointed by the univ. to the professorship of mathematics, and held this post until 1761. His great work was his restoration of Euclid's lost treatise on *Porisms* (1776), but he also pub. *Sectionum Conicarum Libri V.* (1735, 1750); *Apollonii Pergae Locorum Planorum Libri II.* (1749), a restoration of Apollonius's lost treatise; and *Elements of Euclid* (1756), which was for a long time the standard text of Euclid in England.

Sin, a deliberate offence against God, whether by transgressing the law of right and wrong as known by right reason, or the positive divine law imposed by revelation. S. is evil considered as disobedience to, or rebellion against, the Deity. In this sense the idea of S. forms a part of most, if not all, great religious systems; especially of the Christian and Jewish religions, though some modern free-thinkers deprecate the idea of S., and consider it as a vestige of a lower stage of human evolution. Theologians divide S. into original S. and actual S. The former consists in the loss of the righteousness believed to have been the condition of Adam and which should have been handed down as a heritage to posterity. This loss can be made good only by the merits of Christ, the Second Adam, 'in whom all men are made alive.' Baptism removes the guilt of this S., though the resultant inclination to evil in the human being remains. Guilt in this connection is rather to be understood as much poverty and incapacity to please God. Actual S. comprises all the evil willingly wrought by an individual in thought, word, or deed. Actual S. can only be removed by repentance. It is subdivided by Catholic theologians into mortal S., which totally deprives the soul of divine life, and venial S., which can co-exist with the love of God. See G. Quell, C. Bertram, G. Stählin, and W. Grundmann, *Sin* (Bible Key Words Series), 1930.

Sin (or **En-zu**), 'lord of wisdom,' the Babylonian moon-god, chief of the second divine triad, composed of S., Shamash, and Adad, or Shamash and Ishtar. The Babylonian or Sumerian calendar was regulated by the moon, whence the high place held by this god in the national pantheon. S. was the first-born of En-lil, the Bel of Assyria, father of Shamash, the sun, and of Ishtar. He was surrounded by the deep mystery that accompanies the majesty of a supreme deity, and a prayer in the library of Ashurbanipal speaks of

him as a 'divinity' full of love, like the far-off heaven and the broad ocean whose deep inner being no god understands'. Probably the most ancient seat of worship of S was at Ur (where he was known as Nannar), another was at Haran. He held a less exalted position in the Assyrian pantheon being overshadowed by Ashur. A temple was erected to him in Khor-sabad.

Sinai 1 Mt also known as Horeb, from which the law was given by God to the children of Israel. Four places lay claim to the name. The local traditions point to Jebel (Mt.) Serbal 6750 ft or Jebel Musa (Mt. of Moses) 7359 ft as the site of the law-giving. In the sixth century A.D. many anchorites inhabited that region and there were various monasteries. There is at present only one monastery, the Gk orthodox Convent of St Catherine situated in Wadi el Der, which dates from the time of Justinian. Here Tischendorf discovered the famous Codex Sinaiticus (see SINAITICUS CODIX) 2 Administrative div. of Egypt pop. 37,200. It is a triangular peninsula at the head of the Red Sea. In the First World War it was occupied by Brit forces. The inscribed monuments and the stone inscriptions and scribbles which were found in the S peninsula fall into two groups: (1) the inscriptions known as Paleo-Sinaitic probably belonging to the fifteenth century B.C. These inscriptions found in 1904 and after 1924 in Serabit el Khadem are written in a script which Prof. Albright has only recently claimed to have deciphered. This script has been considered by many scholars as the prototype of the Semitic alphabet and hence of all the alphabets (see under ALPHABET). (2) the Neo-Sinaitic inscriptions and scribbles belonging to the first to third century A.D. and written in a script (known as Neo-Sinaitic) which may be considered as the link betw. the Nabataean and the Arabic alphabets. The Neo-Sinaitic inscriptions were mainly found in the S.W. region (S in the dist. of Jebel Musa and Jebel Khathir) especially in the Wadi Farin.

Sinai, vil 12 m S of Feisal on the Prabova in Rumania famous for its monastery. Until the Second World War the vil was a popular summer resort for the nobility. The royal family had a residence at (village) Poles. Pop. 4000.

Sinaiticus, Codex, early Gk vellum codex extant. Originally it probably had at least 730 leaves, now there are only 390 of which 242 contain a part of the O.T. and 148 leaves contain the whole N.T. with the 14th of Barnabas and part of the Shepherd of Hermas. Forty-three leaves (all of the O.T.) are in 14 (plus) three fragments at Leningrad. All the remaining leaves are in the Brit Museum, acquired in 1933, being purchased from the Soviet Govt. for £100,000. C.S. was discovered in 1844 and 1859 by Dr Constantine Tischendorf (1815-74) the critic and decipherer of ancient MSS in the monastery of St. Catherine at Mt Sinai (hence the name 'Sinaiticus'). The leaves, which are of fine vellum, measure 15 in

by 13½ in., and are admirably preserved. The text is written in four columns to the page (two in the poetical books), with forty-eight lines to the column. C.S. seems to have been written by three scribes and there are many corrections. The words are written continuously without separation but high and middle points as well as the colon are used for punctuation. There are no accents or breathings. Sacred names are abbreviated. The place where C.S. was written is uncertain. Egypt is probable and Palestine (especially Caesarea) possible. The probable date is the middle of the fourth century. C.S. was pub. in full by Tischendorf in facsimile type in 1862, a photographic facsimile was pub. by the Oxford Univ. Press in 1911. O.F. 1922. See Codex Sinaiticus (9th ed.) 1931 and H. J. M. Milne and I. C. Skeat, *The Codex Sinaiticus and the Codex Alexandrinus* 1938.

Sinaloa, a state of Mexico bounded by the Gulf of California on the W. The vegetation of the low coast land is tropical but there is a gradual rise to the Sierra Madre Mts. the well watered soil yielding cereals, mineral cotton, tobacco, sugar cane, coffee and fruit. Mining is the chief industry, gold, silver, copper, iron, lead, and salt being found. The cap. is Culiacan and the port Altata. Area 22,600 sq. m. Pop. 493,000.

Sinclair, May (1870-1936) Eng. novelist, poet, and critic, was born in Birkenhead and educated at the Jesus College, Cheltenham. Poetry and metaphysics were her earliest activities. She produced some verse in 1887 and 1890. Her first novel, *Andrey Craven*, was pub. in 1896 but it was only with *The Divine Fire* (1901) that she began to make a reputation for herself comparable with that of George. With *The Creators* (1910) and other works she earned by about 1916 the general reputation of being the foremost contemporary writer among English-speaking women. She served in the First World War with a field ambulance, writing her experiences under the title *Journal of Impressions in Belgium* (1915). Leaving fiction for a time she collated her philosophical meditations in *A Defence of Idealism* (1917) a well-argued thesis of metaphysical thought, and followed this in 1922 with a treatise, *The New Idealism*, and in the same year she pub. *The Life and Death of Harriet Frean*. Her later novels showed finer character delineation and a more finished style than did the earlier one of her best being *A Cure of Souls* (1924). She also wrote a life of *The Three Frontiers* in 1912.

Sinclair, Upton Beall (b. 1878) Amer. novelist, b. at Baltimore, Maryland. He was educated at the college of the city of New York and Columbia Univ. Before he was twenty-seven he had written *Manassas* (1904) a brilliant novel of the Civil War. A Socialist, he turned his attention to capitalist abuses and in 1906 obtained world-wide fame by his powerful novel, *The Jungle*. This was a bitter exposure of the methods existent in the stockyards and meat-packing plants in Chicago, and led to Congress passing the

first national pure food law. In 1913 S. investigated the abuses in the coal-fields of Colorado, exposed them, and once more caused Congress to act. Out of his studies grew his novel *King Coal* (1917). *The Profits of Religion* (1918) is a bitter attack on the alleged coalition of religion with capitalism. *The Brass Check* (1919) seeks to prove the alliance between big business and Amor. newspapers. *The Goose Step* (1923) seeks to show how rich men, by endowing univs., influence the economic and political beliefs of the students, the future leaders of the country. *Money Writes* (1927) shows what he sincerely believes to be the influence of capitalism upon those who produce the country's literature. He received the Democratic nomination for governor of California in 1934, promising to 'end poverty in California by a system of old age assistance.' S. founded the Amer. Civil Liberties Union in California. He won the Pulitzer prize in 1943 for *Dragon's Teeth* (1942). Other works (mostly novels) include *The Way Out* (1933); *Co-op* (1936); *Presidential Agent* (1944); *Dragon Harvest* (1945); *A World to Win* (1946); *Presidential Mission* (1947); *A Giant's Strength* (1948); and *One Clear Call* (1948).

Sind, or **Sinde**, prov. of Pakistan, situated to the N. of the Arabian Gulf, and consisting mainly of an alluvial plain, the E. part of which is practically desert. Being beyond the influence of the monsoons its rainfall is scanty, and most of the cultivated area depends on irrigation by canals, such as the Lloyd Barrage canals and the inundation canals (see **SUKKUR**). Rice is the prin. crop, but cotton and indigo are also among the winter crops, while wheat, barley, oil-seeds, and vegetables are products of spring. The animals of the prov. are plentiful, including camels and buffaloes; and the flamingo, pelican, stork, crane, and Egyptian ibis frequent the shores of the delta. Among manufs. are gold, silver, and silk embroidery, leather work, lacquered ware, carpets, cloths, and pottery; while the S. cotton printers are most skilful. Salt is obtained from the delta of the Indus, and is the only mineral product of importance. There are cement factories at Karachi and Rohri, and an electric lamp factory at Karachi. Woollen and other cottage industries are being developed. A radio lamp works was started at Karachi in 1940, and after war broke out some iron and steel rolling mills were also estab. there. Karachi is the seat of administration, besides being a great terminal airport and an important seaport, exporting cotton, wheat, barley, rice, flour, seeds, wool, etc. The Hyderabad-Jodhpur line connects the frontier with the Jodhpur railway, thus linking S. at Hyderabad with Rajputana, N. and central India, and Gujarat. S. was annexed in 1843. It was a prov. of the presidency of Bombay until 1936. It has a legislative assembly and the governor is advised by a council of ministers. Area 48,136 sq. m. Pop. 4,535,000 (Muslims, 3,208,000; Hindus, including scheduled castes, 1,230,000; Sikhs, 31,000; Christians, 20,000). See J. Abbott, *Sind*, 1924.

Sindbad the Sailor, one of the characters in the *Arabian Nights Entertainments*. He is a wealthy citizen of Bagdad, who makes seven wonderful voyages, discovering a roc's egg, the valley of diamonds, etc.

Sinder, see **ZINDER**.

Sindhia, title of the Mahratta princes of Gwalior. *Ranaji Sindhia* held high rank in the army of the Peshwa, and was governor of a large portion of Malwa. *Mudhaje* (d. 1794), his son, was defeated and taken prisoner at Paniput in 1761, but escaped, and made himself master of Delhi, subsequently capturing Gwalior, Agra, Alighur, and nearly the whole of the Doab, to which he added the states of Jodhpur, Udaipur, and Jaipur. He was succeeded by his grandnephew, *Daulat Rao Sindhia* (d. 1827), who was defeated by Holkar in 1802. The following year he incurred the displeasure of the E. India Company, was routed by Sir Arthur Wellesley at Assaye and Argaum, and forced to cede all his possessions in the Doab and along the r. b. of the Jumna to the Eng. During the mutiny *Raji Rao* (d. 1886) fought against the rebels, but was forced to flee for safety to Agra, as his troops deserted him.

Sindhi Dialect (of Punjabi), see **INDO-EUROPEAN LANGUAGES**.

Sindibad, see **SEVEN WISE MASTERS**.

Sinding, Christian (1856-1911). Norwegian composer, b. at Kongsberg. He studied at Christiania (Oslo) and later, with the Norwegian Gov.'s support, in Germany, where he spent many years of his life. For a time he was prof. of composition at Rochester, New York. Like Grieg, his style is characteristically Scandinavian, but his music is more detached and objective. Among his works are three symphonies, two violin concertos and a pianoforte concerto, chamber music, violin and pianoforte sonatas, etc., and some popular pianoforte solos.

Sine, see **TRIGONOMETRY**.

Sin-eaters, men, who, by partaking of food and drink (often a crust of bread and a pot of ale) in a death-chamber lift the burden of sin from the departed spirit and thus assure to it an 'ease and rest' hereafter. This superstition was especially practised in Wales and the bordering cos.

Sinecure, properly a benefice without cure of souls (*sine cura animarum*). This happens: (1) Where a rector and vicar are instituted to the same church, in which case the former is excused from duty and the rectory is called a S. benefice. (2) Where the benefice, being donative, is committed to the incumbent by the patron expressly without cure of souls, the cure not existing. (3) Where a par. (q.v.) is destitute of parishioners (called also depopulation). Certain cathedral offices, viz. canonries and prebends, are also called Ss. By extension S. is applied to a post of profit for which no work is done.

Sine, Curve. If we wish to construct the curve $y = \sin x$, where x is expressed in circular measure, not in degrees, we proceed as follows. Draw a circle with centre C and radius equal to a unit length (in the

diagram, Fig. 1, this is $\frac{1}{2}$ in., but any convenient unit can be adopted) and through C draw a horizontal line intersecting the circle in A and A' . Take any point O on this line as the origin of coordinates, then if x is the length of any arc of the circle measured from A , it is necessary to represent x along OD measured from O . This is easily done by making OD equal to the semi-circumference of the circle, that is, πr , or if the radius r is taken as the unit, $OD = \pi = \frac{22}{7}$.

point A' or 8 on the circle; it may be noticed that the angle subtended at C by the arc AA' of the semicircle is 180° , the sine of which is zero, and so we should expect the ordinate at D to be zero. If the process is continued for the lower portion of the semicircle the curve below the x axis is produced as shown in the figure, the lowest point L corresponding to B' on the circle, just as the highest point P_8 corresponded to B on the circle. Continuing to the right of E the curve will repeat itself and will be a replica of

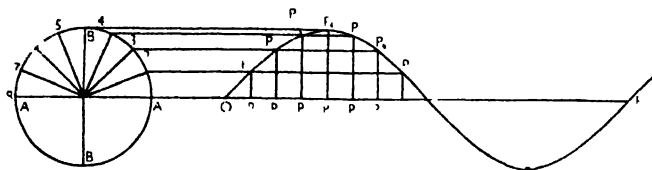


FIG. 1

The semi-circumference is then divided into any desired number of equal parts, say 8, marked 1, 2, 3 . . . 8, and if OD is divided into the same number of equal parts at the points p_1, p_2, p_3 , etc., it is obvious that any arc such as AC_3 on the circle is equal to Op_3 , and so on for the other arcs. The sine of the angle AC_3 is the length of the perpendicular from the point 3 on CA divided by the radius, or since the latter is one unit, it is simply the perpendicular from 3 on CA . From the point p_3 draw a perpendicular p_3P_3

the curve between O and D , and so on. The length OE is called the *wave length* of the curve and is equal to the circumference of the circle.

The equation of the curve $OP_1P_2P_3$ is $y = \sin x$ in its simplest form, but more generally it can be expressed in the form $y = a \sin \frac{x}{b} + c$, and the method for constructing such a curve will be illustrated by assigning numerical values to a, b , and c .

If we take the equation as $y = 7 \sin \frac{\pi}{4} x$

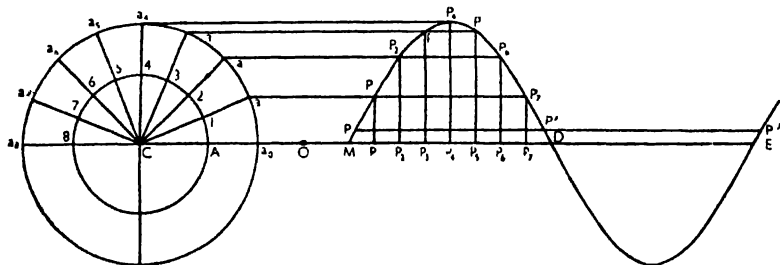


FIG. 2

to OD , meeting a line from 3 drawn parallel to OD in the point P_3 , then it is easily seen that the ordinate P_3P_3 is equal to the perpendicular from 3 on CA , and hence is the sine of Op_3 , which is equal to the arc AC_3 . Continuing the process with all the other points, 1, 2, etc., between A and A' , the ordinates P_1P_1, P_2P_2 , etc., are the sines of the corresponding values Op_1, Op_2 , etc. Notice that the line P_3P_2 passes through the point 6 on the circle and through the point P_6 on the curve, and similarly for the other lines P_1P_1 , etc. The curve intersects the x -axis at D , which corresponds to the

we draw two circles of radii 7 and 4 units respectively (Fig. 2), having a common centre C , and with any point O on the horizontal line through C as origin we measure OM equal to 3 units in the direction to the right of O . If the equation of the curve were $y = \frac{x+3}{4}$ it would

be necessary to measure OM in a direction towards the left of O , that is, in a negative direction. From M measure MD equal to the semi-circumference of the inner circle, the circumference of which is divided into any selected number of equal

parts as before; MD is also divided into the same number of equal parts as the semi-circumference of the inner circle, and the radii C_1, C_2 , etc., are produced to intersect the outer circle at the points a_1, a_2 etc. From these points parallels to the x -axis are drawn, meeting the ordinates at p_1, p_2 etc., in the points P_1, P_2 , etc. These latter points determine the required curve. The proof of this will be clear from the following considerations.

Take any point p_2 the x of which is OP_2 , so that MP_2 is $x-3$, because $OM=3$. The circular measure of the angle AC_2

is $\frac{A_2^2}{CA}$, which by construction is $\frac{MP_2}{4}$

or $\frac{x-3}{4}$, and the ordinate of P_2 is the

same as the ordinate of a_2 , or $7\sin\frac{x-3}{4}$.

The same applies for the other points on the curve, which can then be traced out. As in the first case, it intersects the x -axis at D corresponding to the point A on the circumference of the circle, and then the ordinates are reproduced with negative sign. The amplitude of the curve is the length of its greatest ordinate, which is 7, and the wave-length is equal to the circumference of the inner circle. Using the above equation, the amplitude of the curve is a and the wave-length is $2\pi b$, represented by ME .

The term *phase* is important, and is best understood from an example. From any point P on the curve draw a line parallel to the x -axis, intersecting the curve in the points P' and P'' . Although the ordinates of these three points are the same in magnitude and sign, only P and P'' are in the same phase. In each of these, as x increases y increases also, but in the case of P' , y decreases under the same conditions. We can say that two points on the sine-curve are in the same phase if their abscissae, x and x' , differ by one complete wave-length.

The curve $y = \cos x$ can be constructed in a similar manner. Since it can be written in the form $y = \sin(x - \frac{3}{2}\pi)$, it can

be drawn by taking M at a distance $\frac{3}{2}\pi$

from O or midway between D and E . If the equation of the curve is $y = 7\cos\frac{x-3}{4}$,

it can be written in the form $y = 7\sin(\frac{x-3}{4} - \frac{3}{4}\pi)$, or $y = 7\sin(\frac{x-3-6\pi}{4})$, and

the point M is taken at a distance $3 + 6\pi$ from O , the remainder of the construction being the same.

The sine curve has an important application in harmonic motion (*q.v.*). If the position of a point moving with simple harmonic motion be denoted by x , the expression $x = a\cos(\omega t + \phi)$ is easily obtained, and in this form all periodic phenomena can be described. Simple harmonic motion is isochronous, that is, the period is independent of the amplitude

of the motion, well-known examples of which occur in the simple pendulum, so long as the arc of swing is small, in the oscillations of springs on which weights are suspended, in the vibration of taut wires, etc. The C. of S. represents the simplest forms into which a vibrating string can be thrown; it also represents the instantaneous form of a section of the surface of water along which is passing a series of oscillatory waves. Its applications in various branches are too numerous to deal with.

Sinew, see TENDON.

Si-ngan-fu, see HSI-AN-FU.

Singapore, Brit. colony, which includes the is. of S., together with the Cocos-Keeling Is. and Christmas Is. (*q.v.*). Until the readjustment of 1946 S. was the cap. of the Straits Settlements, which included Penang, Malacca, Labuan, etc.; but these settlements now form part of the Federation of Malaya. S. is an important seaport, situated on an is. of the same name off the southern coast of the Malay Peninsula. It is a naval and coaling station, and the chief *entrepôt* for the E. India trade. It has a commodious and safe harbour, with extensive dockage, protected by fortifications. King's Dock, opened 1913, is the largest E. of Suez. It was in 1922 that the Admiralty, realising that the new orientation of sea power and the ratification of the Washington Treaties had brought to the fore the problem of adequate Far E. preparation for Britain, advised the creation of a modern naval station at S., but it was not until 1938 that the base was completed. The total original estimate was for £7,000,000, irrespective of a new floating dock costing £913,655, which was towed out from England in 1928, and of an air station which was computed at over £576,000. The base was officially opened on Feb. 14, 1938, the closing stages of a very protracted job being accelerated by a gift of £500,000 from the sultan of Johore (see also next article). There are two cathedrals (one Protestant and one Rom. Catholic), sev. mosques and temples; the prin. place of Mohammedan worship is the fine Sultan Mosque in North Bridge Street, and many finely built public edifices, particularly Raffles College, the railway station (built on the site of a reclaimed swamp), the buildings round Raffles Place, and the municipal building, People's Park, with its hundreds of outdoor diners and the cheap-jacks and eating stalls along the Eu Tong Seng Street, prepares the visitor for the maze of crowded streets that thread Chinatown proper, the Chinese quarter. Campong Glam is the Malay and Arab quarter, the spine of which is the North Bridge Road, with Middle Road and Arab Street as the largest ribs. Round Middle Road, Hallam Street, and Malay Street is a Jap. quarter. Facilities for higher education are provided at King Edward VII. College of Medicine and Raffles College. The latter was opened in 1923 to place education of a univ. standard within the reach of all the youths of Brit. Malaya who were capable of profiting by it and also to meet

the need for qualified teachers for secondary classes. The S Trade School gives instruction in general mechanics.

The tn has an enormous trade, its harbour in point of trade (before 1941) being one of the greatest in the world, with exports of tin, rubber, spices, gambier, gums, tapioca, sago, rattans, copra, preserved pineapples, and hides. There are many varied industrial undertakings and almost every kind of civil, mechanical and electrical works, and also shipbuilding and ship repairs are included in the normal activities of S. S is linked by a causeway which carries a road and the railway to Johore, the state which lies immediately N of the is.



SAMPANS AT SINGAPORE

The area of S is 217 sq m including the adjacent islets. It is 26 m long and 14 m wide. The pop of S is estimated in 1948 was Malays 117 164, Europeans 9145, Eurasians 9246, Chinese 747 817, Indians 71 928 and others 6556.

The original city of S is said to have been founded by immigrants from Sumatra. It rose to prominence in the fourteenth century but was destroyed by the Javanese in or before 1577. Thenceforth it was little more than a fishing vil until Sir Stamford Raffles (*qv*) founded a settlement there in 1819 by virtue of a treaty with the Johore princes and later acquired the whole is for the East India Company. The new settlement was at first subordinate to Benecool in Sumatra, but in 1823 it was placed under the gov of Bengal. In 1826 it was united with Penang and Malacca under the governor and council of the Incorporated Settlements. In 1867 the Settlements were transferred from the India Office to the Colonial Office, and were constituted as a crown colony. A further change was made after the surrender of the Jap forces in 1945, when S became a separate colony (Cmd 6724 of 1946).

History of Singapore in the Second World War.—The strategic conception upon

which S was founded was that of a protected naval base from which a powerful fleet could operate, and it was therefore defended against attack from the sea by fixed coastal defences. Mobile artillery and other forms of defence were needed against an enemy approaching from the mainland, and all these were provided in fair quantities. Plans for defence along the Malay Peninsula were worked out when the base was completed. Military airfields were constructed at a number of points on the is and throughout the peninsula. But when the Jap attack was delivered on Malay on Dec 8, 1941 there were not enough adequately trained men or machines to meet it and the Jap had eliminated the threat of the Amir Navy by the attack on Pearl Harbour. When the Jap convoys began to bring to Kota Bahru more infantry reinforcements the Brit commander at S decided to take desperate measures. Adm Phillips (*qv*) stemmed out of S on Dec 9 under low clouds and drizzling rain but the weather cleared and his squadron was observed. Though he turned back for S it was too late and the battl ships *Prince of Wales* and *Repulse* were torpedoed and sunk. Within a week of the start of the enemy attack the Jap had almost complete mastery of the air as well as of the sea. Whether the Brit forces were outnumbered by the Jap in the peninsula is a matter of dispute. In a secret debate in the House of Commons it was stated by the Prime Minister that the Allies had much the more numerous forces but this can only have been at the end after the landing of reinforcements when it was too late and the probability is that the forces were more or less equal at the beginning of the attack on the peninsula. The enemy, however, had the great advantage by reason of intensive training in jungle warfare. Despite many allegations there are few proved instances of both column work or sabotage by the inhab of the Malayan peninsula. Indeed there are many instances through out the campaign of loyal and courageous conduct by Malay, Chinese Indian and other inhab. By the end of Jan 1942 the defence forces had been pressed back to the southern tip of the peninsula and had crossed from Johore to S. The last stand of the Brit forces on the mainland came on a line across the southern tip of the peninsula in open country where the Jap were able to use all their forces together. By Jan 30 the main Brit forces had withdrawn completely to S. The Jap now brought up two more infantry divs and much siege artillery. They could have reduced the is by continuous air and artillery bombardment in a few weeks but they were anxious to capture S quickly on grounds of prestige and because they wished to release forces for fighting in the Indies and Philippines. On the evening of Feb 4 the Jap artillery opened with a heavy barrage, which added to the intensified air assault that marked the final preparations for the attack. Shortly before midnight of Feb 8 the artillery mounted to its greatest intensity and the

defence positions were blanketed by the dive-bombers. A landing was soon effected and the characteristic infiltration tactics practised. The Jap. success was complete and the Is.'s reservoirs then became the focus of conflict. On Feb. 14, with the occupation of the reservoirs completed, a final converging attack from three directions closed in on the doomed city. Air raids added to the serious situation. S. was raided on the opening day of hostilities (when sixty persons were killed), but only slightly molested for a considerable period. But on Jan. 12 came a major daylight raid by three waves of over 100 planes. This was a forerunner of an assault that was now to be intensified as the enemy drew nearer to S. By the time the Jap. reached the straits of Johore the S. airfields were all but untenable, and the defending air force was reduced to a few Hurricanes and their exhausted pilots. A prolonged resistance by the Brit. military forces was useless and Gen. Percival, the commander, therefore decided to surrender and S. passed into Jap. hands on Feb. 15, 1942. There were some 75,000 Brit. troops on the Is., including unseasoned reinforcements flung in at the last moment. The fall of S. was a great military disaster, but to attempt to explain it simply by the alleged incompetence of the military commanders and the mistaken policy of colonial administrators is to misconceive its lessons. Warships, bombers, fighters and reconnaissance planes, guns and tanks — all these war essentials were sent to meet the enemy in other theatres. The choice was made and S. had to suffer. Yet, however painful and regrettable, the decision was inevitable and justified by subsequent events. The fall of S. certainly marked a turning point in Far E. hist., for it showed that the position of the W. powers there was no longer secure, and that consequently the whole relationship of E. and W. peoples had entered upon a new phase. It was no doubt this aspect of the fall of S. which gave it a far deeper significance than that of an irretrievable military disaster. S. was attacked by allied aircraft on numerous occasions; the floating dock, which had been sent to S. in 1942, and raised by the Jap., was sunk in an attack on Feb. 1, 1945. S. was retaken, without opposition, by the Brit. forces on Sept. 6, 1945 (see FAR EASTERN CAMPAIGNS IN THE SECOND WORLD WAR). After the war it was decided to regroup the Straits Settlements and the Malay States so as to form two administrations, the colony of S. and the Malayan Union, each under its separate governor. This arrangement was superseded in 1948 by the creation of the Federation of Malaya on February 1, 1948, Singapore still remaining a separate Crown Colony.

See R. Briddell, *The Lights of Singapore*, 1934; I. Morrison, *Malayan Postscript*, 1942; E. H. Miller, *Strategy at Singapore*, 1942; O. D. Gallagher, *Retreat in the East*, 1942; E. McNair, *The War: Third Year* (Toronto), 1942; D. Bailey, *We Built and Destroyed*, 1944; G. Play-

fair, *Singapore goes off the Air*, 1944; Sir R. Winstedt, *Brillat and Malaya*, 1944; Sir G. Sansom, *The Story of Singapore* (pamphlet pub. in Australia), 1944.

Singapore Base. Singapore, lying athwart the great shipping routes to E. and W., was the ideal place for Britain's new Far E. naval base. The Admiralty plan was first introduced into Parliament in 1923 and its recommendation aroused much controversy, especially among the socialist and pacifist elements, while, naturally, the Jap. press and politicians lost no opportunity of attacking the scheme. Work on the base had not long begun when in 1921 it was stopped by the first Labour Gov., but resumed when the Conservatives again assumed office. When the base was first contemplated the Admiralty had planned to remodel for use one of the two Ger. floating docks acquired after 1918, but it was eventually decided to construct a new dock that could be taken to Singapore in sections. In eighteen months a huge structure was built, capable of accommodating the largest ships of the R.N. and displacing some 50,000 tons. The under-water structure of the dock consisted of large tanks for sinking the platform when taking a vessel in. The dock also contained engineering workshops, electrical equipment and a complete plant for supplying ships in the dock with electrical energy for lighting and power, and a double telephone system. The towing of the two sections of the dock occupied four months, and both sections reached Singapore safely in mid October, 1924. It remained to construct the larger engineering works and the graving dock, but in 1929 the second Labour Gov. suspended work, much to the disappointment of the dominions, which had borne a high proportion of the cost incurred. The new National Gov. proceeded, however, at once to reverse the policy of its predecessor and announced that the scheme contemplated an adequately equipped base, with a graving dock capable of taking the largest ships, a wharf over 2000 ft. long for berthing, a store wharf, fuelling wharf, electrical generating station, dockyard workshops, storehouses, houses and quarters, and an armament depot. In March 1936 the main contract for the graving dock and ancillary units was completed. Combined manoeuvres on a large scale were held in the first half of Feb. 1938, and on Feb. 14 the naval station was officially opened, with elaborate ceremonies. In its completed state the base had a fronting on 20 sq. m. of deep water, an area large enough to berth the entire Brit. Fleet. The base was equipped with 16-in. or larger guns to keep hostile battleships at a distance, 8- or 12-in. guns to dispose of reconnoitring cruisers, quick-firing 6-in. guns for enemy destroyers, 3-in. batteries for hostile mine-sweepers, and machine guns to protect the water-front from hostile landings. Yet, in the Second World War, 11 years later, the great base fell to the Jap. almost without a struggle, because, said the critics, it had no defences to the N. and all its great

guns, embedded in concrete, pointed seaward. The Brit. Pacific Fleet took up its station at Singapore once again in Sept. 1948. *See also* SINGAPORE, *History of Singapore under the Second World War*.

Singara, *see* SINJAR.

Singer, Isaac Merritt (1811-75), Amer. inventor, b. at Oswego, New York. In 1851, after much experimenting, he evolved the first practical single-thread chain-stitch sewing machine, superseding Elias Howe's crude model of 1846. He set up a factory in Elizabethtown, New Jersey, and retired wealthy. *See also* next article.

Singer Manufacturing Company, The, proprietors of the sewing machine invented by Isaac Merritt Singer in 1851. The business began in a small way in Boston in that year by a partnership being formed between Isaac Singer and Edward Clark, but the demand for the new appliance became so great that arrangements had to be made to cope with rapidly increasing business, and the S. M. C. of New Jersey was incorporated. This business has now a cap. of \$90,000,000, divided into shares of \$100 each. It owns ten factories in four different countries, and also holds the control of different selling organisations. The Brit. company is called the Singer Sewing Machine Company Ltd.

Singgora, *see* SINGGORA.

Singbhum, dist. in the Chota-Nagpur div. of Bihar and Orissa, India; it has valuable timber exports. The administrative headquarters are at Chibasa. Area 3891 sq. m. Pop. 1,144,700.

Singing, *see* MUSIC; OPERA; ORATORIO; SOLFEGGIO; SOLMISATION; SONG; SOUND; VOICE AND VOICE TRAINING; *also* ALTO; BASS; SOPRANO; TENOR; TREBLE.

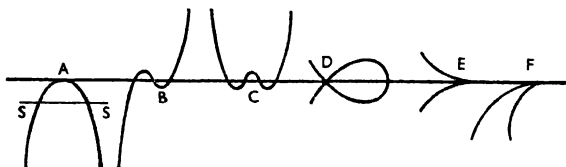
Single-stick, *see* under FENCING.

Single Tax. A tax on land replacing all other taxes. In the eighteenth century in France the Physiocratic School (*q.v.*) held that all taxes ultimately fall on the land; increase of wealth (*produit net*) being due to agriculture and not to industry. They accordingly proposed their *impôt unique* (single tax) on the net income from land. The idea made great headway but was ridiculed by Voltaire. The modern exponent and populariser of the S. T., Henry George (*q.v.*), has a different approach, arguing that only work should be rewarded and not the mere possession of land which no one has made. The landowner should be paid for his improvements: a S. T.—sufficient, he argues, for all revenue purposes—should confiscate the values due to nature and society.

Sing Sing, prison of New York, estab. in 1824, and rebuilt in 1930. The newest cell blocks contain many amenities, such as beds, desks, running water, radio earphones, etc., for most of the 2500 convicts.

Estab. with a view to quarrying marble with prison labour, the prison in its earlier years was organised on the most repressive system of silent group labour and solitary confinement; mail and visitors were not permitted. The marble worked was for a time much used, especially for buildings in a Gk. revivalist style.

Singular Points occur in connection with the plotting of curves, and are associated with the investigation of equal roots of equations. A secant or straight line (SS) cutting across a curve cuts it at two points at least; if it moves in a direction at right angles to its length towards the bend of the curve, these points gradually approach; at the moment when the line leaves the curve where two points coincide (A) the secant has become a tangent, the curve lying to one side of it. If, however, a curve touches at more than two coincident points (BC), singularity occurs. In the case of a looped curve, a node or



crunode with two tangents, one for each branch, is found (D); in the investigation of imaginary quantities, curves may form acnodes or conjugate points (E) or cusps (F). These are known as multiple points. In the figure B and C are shown not in the limit.

Sinhala, *see* CEYLON.

Sinhalese, *see* under CEYLON, INDO-EUROPEAN LANGUAGES.

Sinigaglia, *see* SENIGALLIA.

Sinister, in heraldry (*q.v.*) bend running from the upper right-hand corner (as held by the bearer) to the lower left corner of an escutcheon. Bend sinister is sign of Casardry.

Sinjar (anc. Singara), tn. of Asiatic Turkey, 10 m. W. of Mosul. Singara was apparently first conquered by Trajan, and was the scene of sev. conflicts between the Romans and Persians. Constantius was defeated here in A.D. 318 by Sapor of Persia, who finally took the tn. in A.D. 361.

Sinkiang, large, ill-defined prov. of China, extending from Kansu to the Pamir, formerly known as Chinese Turkestan. It is a high table-land (2675 to 4600 ft.), bordered by the U.S.S.R. on the N.W., Outer Mongolia on the N.E., and Tibet in the S., with an area of 795,769 sq. m. It embraces the basin of the Tarim, which drains an area of 351,800 sq. m., half of which is barren desert. Encircling the prov. is a mt. girdle, composed of the Tianshan and Karakoram Mts., the Belur Tagh, and the Gobi wastes, which for centuries guarded it from the outside world. The climate is extremely severe, and blinding sandstorms are continually sweeping over cities and sifting up lakes and the beds of streams. Wheat, barley,

maize, fruits, and tobacco are grown in the lowland oases. Higher up are pastures for sheep and horses. Wool, cotton, and silk are other products. There are gold and coal resources: it has been estimated that S. possesses 38,000,000 tons of anthracite, 283,000,000 tons of iron, an equal amount of lead, and large quantities of oil and jade. This mineral wealth is now beginning to be developed, with Soviet help. The cap. is Tihwa; other cities are Khotan and Kashgar, famed for their orchards. A motor road runs from Lanchow in Kansu, through Tihwa and the Ili valley to Khorgos on the Kazakhstan frontier, but these are only rough pack-tracks to Tibet and India. There are airfields at Tihwa and Hami. During the Second World War allied military aid to China passed through S., and the air-service to Chungking also passed through it; in far earlier times S. controlled the silk routes between China and the W. world, and through it Buddhism, Nestorian Christianity and, later, Islam, reached China. According to recent Chinese statistics the pop. of S. is 4,012,000, the very varied elements of which reflect the past hist. of the prov. Only 6 per cent are Chinese, these being administrators and soldiers; 77 per cent are Turki, 10 per cent Kazakh, 2.4 per cent Kirghiz, and 1.4 per cent Mongol, with small groups of White Russians, Uzbeks, Tatars, Tajiks, and Manchus.

The name 'Sinkiang' means the 'new province', which it became in 1882, being the first of nine provs. created in addition to the original nineteen as a defensive measure for the outlying regions of China. On the collapse of the Manchus in 1911 it came, like other outlying parts of the empire, under war lord rule, the first governor being a Yunnanese, Yang T'eng-hsin. But Russian influence steadily increased until 1912, when the Soviet Union was hard pressed by the Gers., Mme Chiang Kai-shek flew to Tihwa to persuade Shen Shih-tsai, the governor, to transfer his allegiance once more to the Chinese central gov. In Aug. 1911 the Chinese Gov. felt themselves secure enough to dispense with Shen Shih-tsai's further help, and he was recalled to Chungking. In 1944 Russia fomented a Kazakh revolt, which was followed later by a rising in the Ili valley. The Kazakh rebels formed a gov. embracing a part of S. In the last quarter of 1945 they sought to extend their hold over S., advancing to the gates of Kashgar and besieging Yarkand. The Chinese Gov., in difficulties with the Chinese Communists, had to compromise with the rebels (1946). They agreed that the Ili rebels, whom they left in control of the three N. dist. zones, should be given a measure of autonomy, and be allowed to recruit native regiments for internal security. In 1947 an extremist group of nationalists (as opposed to the central Chinese Nationalists) in S. was pressing for immediate autonomy for S. It is not easy to define the part played by Soviet Russia in the Ili revolt; but it seems clear that, although the revolt had its origins in Turki and Kazakh dislike of Chinese

rule combined with nationalist aspirations, it was exploited by the Russians at an early stage. In its dealings with the Chinese Gov. the Ili regime stressed that it did not wish to secede from China, and that it regarded itself as a part of China; yet it flew its own flag and its internal propaganda was directed towards the concept of a republic of E. Turkestan. It was one of the misfortunes of the peoples of S. that they were situated in a region where the interests of Soviet Russia and Nationalist China clashed with the result that they seemed fated to be pawns in a game of power-politics. The Chinese, however, in administering the prov. were confronted with what was essentially a colonial problem and, in spite of a façade of native self-rule, all real control remained (until 1949) in their own hands. Later, when the Communists were overrunning China, the situation changed, and in Sept. 1949 it was reported that S. had gone over to the Communists.

See C. P. Skrine, *Chinese Central Asia*, 1926; A. von Le Coq, *Buried Treasure of Chinese Turkestan*, 1928; O. Lattimore, *Desert Road to Turkestan*, 1928; and M. A. Stein, *On Ancient Central Asian Tracks*, 1933.

Sinking, operation of excavating and lining shafts to reach mineral deposits at depth. A complete geological exploration of the area is a necessary preliminary to fix the most favourable position for S. This is usually done by trial boreholes. The size of shaft is also important, and the trend is towards large shafts; in Britain shafts up to 25 ft. diameter have been sunk. The modern practice is to erect the permanent headgear and winding engine at the outset, and use a giant power-driven crane, with a swinging jib, as a temporary arrangement for winding the debris from the shaft.

The S. is commenced by dazging out the alluvial, and as the shaft sides are laid bare temporary supports are put in. These consist of iron rings, made in segments, and bolted together. The first ring is suspended from a strong wooden tramping at the shaft top. The second ring is suspended from the first by iron hangers or hooks. The rings are set at 4 or 5 ft. vertical intervals in the shaft, and lagging-boards are fixed behind and against the rock sides. Every fourth ring or so is supported on steel pegs driven into the ground. These temporary supports are inserted for depths of 20 yds. or so, before the permanent brick lining is put in. On reaching a firm bed of rock a foundation is prepared to receive a curb on which the brick wall is constructed. When S. is resumed sufficient ground is left to act as a temporary support under the curb. The shaft is then opened out to its full diameter, and temporary rings put in as before. Having excavated another 20 yds. or so the second curb is laid down, and the second length of walling is built upwards to join the first section. A scaffold or staging is suspended in the shaft to enable the masons to construct the walling.

When S. through hard rock drills and explosives are necessary to break it. Power

drills are normally employed, mounted on steel frames, which enable sev. drills to operate simultaneously. An explosive of the nitro-glycerine class, having a strong shattering effect, is usually used. The modern tendency is to adopt delay action firing in shaft S., as it possesses many advantages over the ordinary electric firing. The debris at the shaft bottom is loaded by shovels into large capacity buckets or kibbles, which are hoisted to the surface and discharged. In the U.S.A. particularly, mechanical aids have been introduced to reduce this labour. These comprise short scraper elevators, which are loaded at floor level and discharge into the kibble.

When S. through rocks yielding moderate to large quantities of water, a special shaft lining, such as brick coffering, concrete, or tubing is employed to seal off the water. Coffering, which is not often employed nowadays, consists of a thick brick wall, with the space behind well rammed with puddled clay. A concrete lining may be constructed from solid blocks, moulded to the radius of the shaft, and laid in good quality cement. Liquid concrete is also used, in which case, forms or shutterings are necessary to retain the plastic concrete in position until it sets firmly. In many S. the concrete is reinforced by steel to give additional strength. Cast-iron tubing consists of a series of rings, each being made up of sev. segments. There are two types of tubing, namely, the Eng. system with the flanges next to the rock sides, and the Ger. system with the flanges facing the shaft space. The tubing is built upwards, ring after ring, and all joints are made with strips of yellow pine or sheet lead. In the Eng. system each ring is kept in position by tight wedging and the interlocking of the flanges. In the Ger. method the ring segments are bolted together which makes them particularly strong for resisting heavy pressures.

The cementation process of S. through heavily watered ground was introduced into Britain in 1911 by the François Cementation Company. Liquid cement is injected, at high pressure, into the water-bearing fissures. When the cement has set the water is completely sealed off, and the S. can then proceed in the ordinary way. A second length is then cemented, excavated, lined, and the process is repeated until the water-bearing strata have been passed. Pile S. is sometimes adopted to penetrate loose sand or gravel of limited thickness. A strong timber frame is fixed at the shaft top and piles, made of pine wood, are driven down all round the frame. The piles are 2 to 3 ft. long, pointed and shod with iron to prevent them splitting. Excavation of the sand is then commenced, and after digging 2 ft. or so a fresh frame is placed inside the piles to support them. Another round of piles is forced down, and the process repeated until the hard rock is reached, when the shaft is lined with brick or cast-iron rings. In drum S. a plain cast-iron cylinder may be used. The lower ring has a cutting shoe and weights are added

on top to force it through the sand. The sand may then be loaded out by a Priestman dredger, which can remove a ton of material at each scoop.

The freezing process of S. through water-bearing measures was introduced about fifty years ago by Poetsch. A number of boreholes, fitted with tubes, are put down in the ground around the shaft, through which is circulated a freezing mixture consisting of cold brine. A wall of frozen ground is thus formed around a soft central core. S. is then carried down in the usual way and a water-tight lining put in. The freezing method was applied successfully at Calverton by the B. A. Collieries Ltd. in 1918. The Goberts and Koch systems are modifications of the Poetsch freezing process. Another method sometimes applied in hard, heavily watered rocks is the Kind-Chaudron, in which the shaft is bored out in two stages. A small shaft is first bored by a boring tool called a trepan and afterwards enlarged by a larger trepan. The shaft is then lined with tubing, all operations being performed while the water is still in the shaft. The shafts at Dover Colliery, Kent, were sunk by this method. In the Pattberg method, the shaft is bored out in one operation and large pumps employed to force the muddy debris to the surface.

Under normal dry conditions a S. rate of from 20 to 30 yds. per month can be obtained, although rates up to 70 yds. and more have been achieved. Future S. will probably reach depths exceeding 4000 ft., and a depth of 6000 ft. may be viewed as a tentative limit, bearing in mind all the geological and engineering difficulties involved. Since the cost of S. a shaft 25 ft. in diameter would range between £400 and £500 per yd., it is manifest that deep S. of the above order will be very costly propositions. See C. Le Neve Foster, *Text-book of Ore and Stone Mining*, 1905; G. J. Young, *Elements of Mining* (3rd ed.), 1913; J. Riemer and J. W. Brough, *Shaft Sinking in Difficult Cases*; and W. S. Boulton, *Practical Coal Mining*.

Sinking Fund, fund formed for the purpose of paying off previously incurred public debt. The literature on the subject is perhaps as great as the confusion of thought that has ever characterised the efforts of politicians to make use of the device. Dr. Hamilton in 1550 pointed out the obvious fact that no S. F. could be efficient for the purpose of diminishing the debt unless it were made up of the excess of the revenue over the expenditure. Yet the S. F. of Great Britain at that date was in name only, there being no such excess. The plan of the S. F. was projected by the earl of Stanhope, but first adopted in 1716 by Walpole; it was made up of the excess from the S. Sea Aggregate, and General Funds. The fund was increased in 1727 by further reductions of the interest on the public debt, which added a sum of £400,000 to the S. F. For a time the S. F. was regularly applied to its ostensible purpose, but soon the ministry began to take money from the

S. F. for the services of the year. Walpole's S. F. terminated in 1786, when Pitt constituted a new fund by appropriating £1,000,000 per annum to it, the public debt then amounting to £238,231,248. The idea of this S. F. was that when, by the accrual of dividends on stock purchased by the million, the fund amounted at compound interest to £4,000,000, it was to be invested in the public funds, but the dividends thereafter accruing were no longer to be added to it for investment, but applied to the diminution of taxes. In 1792 a S. F. of a novel character was constituted in the shape of a fund of 1 per cent on the capital stock created by every loan; this percentage, which was to be raised by a tax, being over and above the provision for the interest of the loan; the idea being that no relief should be afforded to the public from the taxes which constituted the 1 per cent S. F. until a sum of capital stock, equal to that created by the loan, had been purchased by it. This really introduced the principle of the true S. F. as it is now understood, viz. that in raising further loans, besides interest, provision should be made for gradual redemption. Modifications of Pitt's scheme were introduced by Lord Sidmouth and Lord Henry Petty, the latter, in a complicated arrangement to lessen the burden of taxation; but in 1813 Vansittart, then chancellor of the exchequer, proposed to revert to Pitt's Act of 1792 with the object of restoring to the stockholder all the advantages of that Act. He proposed as did Pitt, to discharge the old debt with the S. F. of £4,000,000, but the interest of debt so discharged was to be available for the public service, and the public was not to be relieved from the charge in the remainder of the debt (then £238,000,000) till the £4,000,000 at simple interest, and the further S. F. which might arise from the falling in of terminable annuities (see PUBLIC DEBT), together with an additional sum of £200,000 per annum, voted in 1792, with their accumulations, had redeemed the capital of £238,000,000. The S. F. arising from the 1 per cent on each loan was to be applied to each separate loan for which it was raised. The breach of faith involved in this circuitous change was, as its author acknowledged, the fact that the stockholder was deprived of the advantage of 1 per cent S. F. on a capital of over £36,000,000 (the total amount in 1802 of the capital created by the loans), while in addition the Treasury was taking for public service the interest not on the £4,000,000 but on £238,000,000, on the specious plea that the whole or consolidated S. F.s, comprising the 1 per cent on every loan raised since 1792, had purchased £238,000,000 of stock. Vansittart's was the last alteration in the machinery of the S. F., and no doubt the worst. The net result of the financial jugglery of the chancellors up to 1828, as shown in the report of the Parl. Finance Committee of 1828, was that over £1,000,000,000 of fresh loans had been raised to redeem, nominally some £500,000,000 of the public debt. The

different Acts relating to the S. F. were repealed in 1866, and except for the provisions in 38-39 Vict., c. 45, relating to the payment of surplus revenue ('old S. F.') to the national debt commissioners, nothing now survives of Pitt's scheme of 1786. In 1875 the 'new S. F.' was established by being enacted that a permanent ann. charge on the consolidated funds (such charge amounting to £28,000,000 after the second year from the passing of the Act) should be applied to the payment of the debt; and that out of the permanent ann. charge certain specified ann. charges should be paid (perpetual or terminable annuities on the consolidated funds, interest on Exchequer bonds or bills, interest on Bank of England advances, etc.).

The present state of the law with respect to the S. F. may be stated to be simply this: that the new S. F. is included in the expenditure of the current financial year, while the old S. F. was merely the surplus of revenue, if any, after all the expenditure had been met; and that the new S. F. must by statute be applied to no other purpose than the reduction of the National Debt, but the old S. F. might be applied to any other purposes if a special Act were passed authorising such different application. Lloyd George, as chancellor of the exchequer, in introducing the celebrated Budget of 1909, made proposals for 'raising' the new S. F. to the extent of £6,000,000, which found expression in an Act ultimately passed in 1910. By this Act the payment of that part of the permanent ann. charge for the National Debt which was not required for the ann. charges (see above), or for the reduction of Exchequer bonds, was suspended.

In 1923 another 'new' S. F. was established by Stanley Baldwin. This in turn gave place to that of Winston Churchill, who in the Budget of 1928-29 established a new permanent debt charge. This was originally fixed at £338,000,000 and later increased to the present figure of £500,000,000. Debt reduction is made by means of terminable annuities, the capital value of which is deducted from the debt upon the expiration of the term for which the annuities are payable, and by means of a number of specific S. F.s, viz. 4 per cent Funding Loan S. F., 3 per cent Funding Loan S. F., Victory Bonds S. F. Payments for these specific funds and terminable annuities are met from the permanent debt charge in years with a surplus of ordinary expenditure, in years with a deficit 'above the line,' they appear 'below the line.' S. F.s payments totalled £18,723,000 in 1949-50 (capital of terminable annuities £1,050,000; 4 per cent Funding Loan S. F. £6,534,000; 3 per cent Funding Loan S. F. £5,121,000; Victory Bonds S. F. £5,718,000). See also under PUBLIC DEBT. See D. Ricardo, *Principles of Political Economy and Taxation*, 1817. J. R. MacCulloch, *Principles of Political Economy*, 1820; J. H. Burton, *Sinking Fund, Reserve Funds, and Depreciation*, 1922; and House of Commons, *Sinking Funds*, 1940.

Sinn Féin ('We Ourselves'), name of the

nationalist movement active in Ireland during the period 1905-22 to gain complete economic and political separation from England. It took its name from the watchword of the organisation Cumann na Gaedhal, based on the policy which was advocated by Arthur Griffith (q.v.) editor of the jour. *The United Irishman*. He proposed that Irish M.Ps. elected to the Imperial Parliament should not attend at Westminster but remain in Ireland to form a national gov. At the beginning of the First World War, S. F. declared its neutrality, but under the leadership of James Connolly a violent anti-Brit. policy was followed by many members, and in 1916 the Sinn Féiners claimed to be the 'Provisional Government of the Irish Republic.' In Sept. 1915 the S. F. leaders formed the Irish Volunteers, following a famous speech by John Redmond in the same year. In Nov. this body joined forces with the Citizen Army and thereafter fomented rebellion against the Brit. Gov. A serious rebellion under their direction broke out in Ireland in 1916, known as 'the Easter Rising,' but was soon suppressed, and Connolly and thirteen of his followers were shot. But from this time onwards S. F. gained more and more popular support. Prior to the First World War a Home Rule Bill had been passed (see under HOME RULE), but the war delayed its operation, and when the time came for its reconsideration the whole situation had changed. The result of the general election of 1918 showed how bitter opinion towards England had become, for the S. F. party overwhelmed the old-time Nationalists, of whom only seven were returned to Westminster, and even Dillon, who had succeeded John Redmond (q.v.) as leader, was defeated. It was at first imagined that the S. F. victory merely marked a reaction against the constitutional methods of the old party, but it soon became apparent that the new party had evolved plans of its own which aimed at discrediting the Brit. Gov. in Ireland and setting up in its place a new republican gov. After the First World War, the Home Rule Act, which, as stated above, was in abeyance during the war, was superseded by the Government of Ireland Act, 1920, Ulster electing to remain united with Great Britain; the S. F. party, however, rejected the Act, and a 'state of war' between Ireland and England existed until a 'peace treaty' was signed on Dec. 6, 1921, by which the state of Eire was set up in southern Ireland (see EIRE). After the Brit. forces had evacuated N. Ireland, the leaders of the Free State had difficulties with the disappointed republican party or Sinn Féiners led by de Valera (q.v.) and waged war on S. F. until 1923. See further under EIRE. See W. O'Brien, *The Irish Revolution*, 1923; P. S. O'Hegarty, *The Victory of Sinn Féin: How it won it and how it used it*, 1924; D. Macarville, *The Irish Republic*, 1937; and N. Maussergh, *Ireland in the Age of Reform and Revolution*, 1942.

Sinnibaldo, Fiescho, see INNOCENT (popes), Innocent IV.

Sinob, see SINOPE.

Sino-Japanese War (1894). Jap. interest in the integrity of Korea, which country her commercial enterprise had opened up to the world, was the real cause of this war. Its immediate cause, however, was the violation of an agreement made between Li Hung Chang (q.v.) and Count Ito (q.v.) for maintaining the *status quo*, by the dispatch of Chinese troops to Korea without due notice to the Jap. Gov. Japan's first opportunity for interference was the earlier embroilment of China with great foreign govts. through disorders in Korea, of which country China was the nominal suzerain; and Japan then secured a treaty with China involving the independence of the principality. The Chinese Gov. then sought to retrieve the position by intrigues which soon brought the two countries to the brink of war, troops from both being already in Korea. Then followed a number of tragic incidents, which compelled Li Hung Chang to arrange a *modus vivendi* with Count Ito, under which the troops on both sides were withdrawn; but the agreement was broken in the manner above indicated, and war was declared by Japan on Aug. 1, 1894, actual hostilities having begun a week previously with the sinking of the transport *Koeshing*, an Eng. vessel carrying Chinese troops.

In the battle of Pingyang (Sept. 15), a Chinese army was routed. On Sept. 17, however, the Chinese Navy fought stoutly at the battle of the Yalu, but lost sev. ships. Late in Oct. a Jap. army under Count Oyama (q.v.) invaded Manchuria. The fortress of Port Arthur was taken by storm on Nov. 21, with only slight loss to the Jap. who, however, marred the previous record of their humane advance by an unwarranted massacre. But the advance was so successfully prosecuted that the Chinese Gov. sent one Detring, an Eng. employee in the Chinese customs service, to open peace *parlours*. Like many other emissaries in the course of the war, he was not recognised. Hancheng and Kalping then fell to the Jap., these victories giving them complete control of the Liaoting peninsula; and in Feb. 1895, at the decisive battle of Weihaiwei, the Chinese land and sea forces were utterly defeated, the Chinese adm., Ting, committing suicide in his ship. The Jap., continuing to advance, now closed on Peking, with the result that Li Hung Chang himself departed for Tokyo to conclude peace.

A treaty was signed at Shimonoseki in April and ratified in May at Chifu, under which Korean independence was recognised, and Liaoting, Formosa, and the Pescadores were ceded to Japan. Other terms included the opening of ports in Szechuan, Hupoh, and other provs., and a large indemnity to Japan. Later, however, Japan was induced by France, Germany, and Russia to give back Liaoting in exchange for an increased indemnity.

Sino-Japanese War (1931), see under CHINA, History.

Sinope (Sinop or Sinob): 1. Prov. of Turkey, between the Kisi Irmak R. and the coast of the Black Sea. Pop. 198,800. 2. Cap. and harbour of the above on a peninsula. In ancient times it was the most important of all the Gk. colonies on the shores of the Euxine. It was a very early colony of the Milesians. Having been destroyed in the invasion of Asia by the Chimerians, it was restored by a new colony from Miletus, 632 B.C., and soon became the greatest commercial city on the Euxine. It passed under Turkish rule in the fifteenth century. Pop. 14,700.

Sint-Agathe-Berchem (Fr. *Berchem-Sainte-Agathe*), suburb of Brussels, Belgium, 3 m. W. of the city. It has manufs. of chicory, ceramics, billiard balls, stoves, and gas-ranges. Pop. 11,200.

Sint-Amandsberg, tn. in the prov. of E. Flanders, Belgium, forming a N.E. suburb of Ghent. There are extensive market gardens and flower nurseries. Pop. 21,300.

Sint-Andries, tn. in the prov. of W. Flanders, Belgium, 2 m. W.S.W. of Bruges. Agriculture and manufs. of carpets, bristles, and oil are carried on. Pop. 10,600.

Sint-Eloi, *see* ST. ELOI.

Sinter, deposits of carbonate of lime and silica formed by the exsorption of spring waters, etc. Calc-S. or travertine, is cavernous and irregularly banded. Siliceous S. is found in Iceland as vast deposits from hot springs. The beautiful terraces of Rotomahana in New Zealand were of S., and deposits of varied tint occur in the Yellowstone Park of America.

Sint-Genesius-Rode (Fr. *Rode-Saint-Genèse*), tn. in the prov. of Brabant, Belgium, 8 m. S. of Brussels. Agriculture and the manuf. of paper, cardboard, soap, and furniture are carried on. Pop. 8,200.

Sint-Gilles-bij-Dendermonde, tn. in the prov. of E. Flanders, Belgium, 1 m. S.E. of Dendermonde. It has tanneries, breweries, and manufs. of shoes and blankets. Pop. 9,700.

Sint-Gillis, *see* ST. GILLES. 2.

Sint-Jans-Molenbeek (*Molenbeek-Saint-Jean*), manufacturing suburb of Brussels, Belgium, just N.W. of the city. It makes textiles, carpets, oil, margarine, soap, tinned foods, mirrors, and has foundries of iron, copper, and bronze. Pop. 63,900.

Sint-Joost-ten-Noode, *see* SAINT-JOSEF-TEN-NOODE.

Sint-Katelijne-Waver, tn. in the prov. of Antwerp, Belgium, 4 m. N.E. of Mechelen. Agriculture and market gardening are the prin. activities. Pop. 10,300.

Sint-Kruis, tn. in the prov. of W. Flanders, Belgium, forming an E. suburb of Bruges. It has manufs. of furniture, chemicals, and textiles. Pop. 7,900.

Sint-Lambrechts-Woluwe, *see* WOLUWE-SAINT-LAMBERT.

Sint-Niklaas (Fr. *Saint-Nicolas*), city in the prov. of E. Flanders, Belgium, 12 m. W.S.W. of Antwerp. It is the cap. of the anct. Waasland. The manufs. consist of woollen, cotton, and linen goods, carpets, pottery, bricks, and furniture. Its market place, the Groote Markt, is the largest in

the country and covers an area of about 41,000 sq. yds. There is a very interesting archaeological museum. Pop. 44,000.

Sint-Pieters-Leeuw, tn. in the prov. of Brabant, Belgium, 7 m. S.W. of Brussels. It has weaving mills, oil factories, and manufs. of paints, varnish, chemicals, and porcelain. Pop. 10,600.

Sint-Pieters-Woluwe, *see* WOLUWE-SAINT-PIERRE.

Sint-Truiden (Fr. *Saint-Trond*), city in the prov. of Limbourg, Belgium, 11 m. S.W. of Hasselt. It has tanneries, iron and copper foundries, rope-walks, breweries, and manufs. of lace, sugar, enamelled goods, tile-stones, and stoves. The lovely city is situated in a region covered by extensive orchards. It is a very important fruit market, and is generally considered to be the first of Europe for cherries. Pop. 19,000.

Sinuessa, anct. city of Latium on the Via Appia. It was colonised by the Romans in 296 B.C., and being situated on the coast and possessing a good harbour it was of considerable commercial importance. In its neighbourhood were warm baths called *Aqua Sinuessana*.

Sinus, cavity. An air-S. is a cavity in certain bones containing air, particularly one communicating with the nose (*see* SKULL). The term S. is also applied to a channel containing blood, especially one containing venous blood; also to a fistula.

Sinus Ælanticus, *see* AKABAI.

Sion (Ger. *Sitten*; Rom. *Seaanum*), cap. of the canton of Valais, Switzerland, 25½ m. E. of St. Maurice. It has three ruined castles, a cathedral (fifteenth century), and the church of St. Catherine (thirteenth century). Pop. 7,000.

Sion College, institution on the Victoria Embankment, London, which was founded in 1623 by the Rev. Dr. White as a college guild of parochial clergy and almshouse. The original buildings were on the foundation of an old priory near the London Wall, but in 1884 the almshouse was abolished, and the college removed to new buildings in 1886. It contains the most valuable theological library in London.

Siouan, linguistic family of N. Amer. Indians, so called from the Sioux or Dakota, its prin. div. They are to be found mainly in the U.S.A., but some 2000 still inhabit Brit. N. America. The Sioux or Dakota tribe have always been conspicuous for their physical strength and courage, and though they fought on the side of the Eng. during the War of Independence, have shown themselves hostile to the whites, and were not finally subdued until 1890, when Sitting Bull (q.v.), a famous leader, was killed at Wounded Knee Creek. *See* De Cost Smith, *Red Indian Experiences*, 1949.

Siout, *see* ASYÔT.

Sioux, *see* CROW INDIANS; SIOUX.

Sioux City, city and co. seat of Woodbury co., Iowa, U.S.A., on the Missouri, 156 m. N.W. of Des Moines, on the site of a former great Indian camping ground. It is an important railway centre and manufacturing tn., with flour mills and meat-packing and machine-shop industries. After the first railroad reached

the tn, its development was remarkable, the pop multiplying fivefold between 1880 and 1890. There are many notable buildings, including Morningside College (1890). Pop 92,400.

Sioux Falls, city and co seat of Minnehaha co., S Dakota, U S A, on the Big Sioux R. The riv here falls 100 ft and supplies water power for many industries. It is a great wheat and livestock centre. Pop 40,800.

Sioux State, or **NORTH DAKOTA**.

Siphnos, **Siphnos**, or **Sifanto** is of Greece famous for its pottery. It is one of the Cyclades and lies N E of Melos. It was in ancient times colonised by Ionians from Athens and attained great prosperity owing to its wealth in gold and silver. Pop 10,000.

Siphon, bent tube with arms of unequal length used for drawing off liquid from one vessel into another. In use the tube is first filled with liquid and placed so that the shorter arm dips into the vessel to be emptied. The pressure on the short arm side of the bend is then equal to the pressure of the atmosphere minus that of a column of liquid of the height of the short arm measured vertically. The pressure on the long arm side of the bend is equal to the pressure of the atmosphere minus that of a column of liquid of the height of the long arm. Consequently there is movement of liquid from the short arm side of the bend to the long arm side and this continues until the mass of liquid becomes discontinuous or until the heights of the columns in the two arms are equal.

Siphonophora, see **HYDROZOA**.

Siphon Recorder, see **RI-CORDER**.

Sipontum, city of ancient Italy in Apulia. It was situated on the coast on the slope of Mt Garganus and was of Greek origin. It was a place of commercial importance after its colonisation by the Romans but in the thirteenth century its inhabitants were removed to Manfredonia the city having decayed owing to frequent outbreaks of fever.

Sippara, see **BABYLONIA**.

Sipunculus, genus of worms of the phylum Cephalopoda with a long retractile proboscis. The species are well known and one is eaten by the Chinese. It is not closely related to the true worms (Annelida).

Sir (Fr *sire* a variant of *seigneur* from Lat *senior*) official title of baronets and knights which is prefixed to the Christian name of the bearer e.g. Sir Francis Laking, Bart., Sir George Alexander. Originally applied loosely to any person of position it is still used in polite address.

Sirach, see **ECCEPHIANICUM**.

Siracusa, see **SYRACUSI**.

Sirajganj, tn of E Bengal Pakistan on the Jamuna section of the Brahmaputra. There is trade in rice and jute. Pop 32,000.

Siraj-ud-Daula, see **SIRAJAH DOWLAH**.

Sirdar (Persian *sardar* a leader), title of the native nobles in India. It is also applied to the commander in chief of the Egyptian Army.

Sir-daria, see **SYR DARI**.

Sir Edward Pellow's Islands, see **PELLEW'S GROUP**.

Siren, typical genus of tailed amphibia in the family Sirenidae. The species are characterised by having four fingered forelimbs, three external gills on each side, no hind limbs and no eyelids. *S. lacertina* is the mud eel, and occurs in N America. It resembles *Proteus* (q.v.) except that teeth and hind limbs are absent in *S*.

Siren, sound signalling apparatus. As used for air raid or fire warnings, etc., the *S* consists of three parts, viz motor, rotor and stator. The rotor is fixed to the motor spindle and spins inside the stator, which is fitted to the motor frame. Whilst the motor is running air is drawn through a large hole in the end of the rotor, and is then drawn out through a number of openings in the rotor and stator. As the openings in the rotor pass the openings in the stator the air is able to pass freely but as the openings in the rotor pass the closed part of the stator the air is obstructed. The pitch of the note emitted depends upon the number of openings in the rotor and the speed of the motor. e.g. ten openings give 112 vibrations per sec. with the motor running at 3000 revolutions per minute approximately. The volume of sound depends upon the amount of air passed through the rotors.

Another type is especially used in light-houses and lightships (though also in factories, etc.). It has the advantages of a steady and immediate note, great volume of sound and the ability to produce precise blast sequences and has a characteristic grunt at the end of each blast. This is the 'diaphone' of which several are produced. It operates by compressed air fed to the instrument from an air storage tank. When the driving valve is opened air is admitted to the back of a piston, causing it to oscillate rapidly and exhaust air through ports. Once the piston is in motion a sounding valve is opened allowing a much larger volume of air to reach the chamber, and pass through the annular slots in the cylinder bore. The piston, which is cut with identical annular slots, oscillates so that during each movement the slots in the piston match with the slots in the cylinder. When this happens air passes from the chamber through the cylinder wall and piston to a resonator with a large puff. Due to the reciprocating action the puffs of air occur rapidly at about 150 per sec. and are of considerable volume. This results in a very powerful sound being produced. The note emitted is pitched at approximately *k* in the bass clef.

Sirenia, order of mammals which contains the sea cows in many fossil forms have been found as well as the living species of the genera *Halimene* (or *dugongs*) and *Manatus* (or *manatees*). *Thalysia stelleri*, or *Steller's sea cow* which attained a length of 25 ft, became extinct about 1768. The *S* inhabit various coasts, and are purely vegetarian in diet. The mammary glands are pectoral in position, so that the *S* may have been mistaken for mermaids.

Sirens, in Greek mythology, sea nymphs

who by their songs were able to lure all mortals to destruction. Ulysses filled the ears of his companions with wax and tied himself to the mast in order to pass them in safety, and when the Argonauts called by the S., Orpheus surpassed them in singing. After this they throw themselves into the sea and were changed into rocks.

Sirhind: 1. Country in the N.E. of the Punjab, India, between the Jumna and Sutlej Rrs., watered by the S. Canal (1882), with 538 m. of main and branch canals, which irrigate 2000 sq. m. 2. Small tn. in Patiala state. It was a great Mogul city until plundered by the Sikhs in 1709, and destroyed in 1763.

Siricius, Saint (d. 399), b. in Rome, was pope from 384 until his death. An epoch in papal hist. is marked by his letter to Archbishop Himerius of Tarragona, which has been called the first papal decretal and is among those considered genuine (see ISIDORIAN DECRETALS). His papacy has some slight importance in the development of the primacy for that reason, but the influence which he and his successor Anastasius I. (398-401) exercised upon W. Christianity cannot compare with that of their contemporary Ambrose (q.v.) bishop of Milan.

Sirius, or a *Canis Majoris*, popularly known as the Dog Star, is the brightest star, so bright that it is in a class by itself. Its magnitude is represented thus, -1.6. It has a proper motion of 132" a century, and it is distant a little over 8½ light years. This distance is being decreased by 9 m. each sec. S. belongs to Secchi's first type of star, which type is often called 'Sirian' after it. These stars are either white or blue (S. is blue), and their spectra show broad dark lines due to hydrogen. S. is nearly thirty times more luminous than the sun, is a binary with a fifty-year period, its companion being an eighth-magnitude star of enormous density—about 30,000 times that of water.

Sirocco (*Scirocco*), name applied to a type of wind, the dry, dust-laden wind of Algiers; in Sicily and S. Italy it is very humid after its passage over the Mediterranean, and blows from the S.E. or S.W. See also MEDITERRANEAN SEA.

Sirohi, or *Serohees*: 1. State of Rajasthan, India. Area 1988 sq. m. Pop. 233,900. 2. Cap. of S. state, 28 m. N. of Abu-road station. It manufs. sword-blades. Pop. 9500.

Siros, see *SERES*.

Sir Thomas Smith's Island, see *JAN MAYEN ISLAND*.

Sis (anct. Sision, or Siskia), tn. in the Seyhan vilayet, Asiatic Turkey, on the Jihun, south of the Taurus Mts. It is the see of an Armenian patriarch, and has a large monastery. Pop. 4000.

Sisal Hemp, fibre obtained from the *Agave sisalana*, a species of Amer. aloe, found in Indonesia, Florida, Mexico, and the Bahamas, also imported into the W. Indies. The plant, which resembles a giant cactus, flourishes on rocky soil, but cannot exist with frost. It takes its name from Sis, a port of Yucatan, whence comes one-third of the world's supply of

S. H. or henequen, as it is also called. The plantations in Yucatan are almost entirely Mexican owned. There are extensive plantations of S. fibre in Tanganyika ter., and the ann. crop amounts to about 105,000 tons of fibre from nearly 300,000 ac. In 1935 the area under S. H. in Tanganyika was 276,500 ac., mostly in the coastal belt near Tanga, and the product accounts for half of the tonnage of exports (80,500 tons in 1936), from the ter. S. H. has been grown in Kenya from its early days, but it was not until 1915 that export reached 1700 tons. In 1936 exports reached 35,000 tons. The acreage was 205,000 in 1947-48. Production is in the hands of Europeans, whereas in Tanganyika a fourth of the crop is produced by Indians. The leaves of the plant measure some 5 ft. in length, and are narrow, being also about ½ in. thick. The pulp is removed by machinery, and the fibre, which is strong and straight, is used for making cord, rope, matting, and sacking. There is also an inferior make of hemp from another plant of the same species, known as 'false S. H.' See also under *FIBRE AND FIBRE SUBSTANCES*.

Sision, or *Siskia*, see *SIS*.

Siskin, *Aberdevine*, *Tarin*, and *Black-headed Thistle-finch*, popular names of *Chrysomitris spinus*, a species of Fringillidae related to the goldfinch. Its colour is a greenish-yellow, and it is frequently seen in Britain.

Sisley, Alfred (1840-99), Fr. landscape painter of Eng. descent, b. in Paris. He worked both in England and France. He became acquainted with Monet and Renoir in the studio of the classical painter, Gleyre, whose style Monet abjured for Impressionism. S. was a member of the Impressionist group, and his work shows the influence of the light-effects of Monet. The Thames and the Seine are frequent subjects of his pictures. 'The Seine at Port-Marly' was sold in 1907 for over £600 but his landscapes were little valued during his lifetime.

Sisterhoods, communities of women living together for religious or charitable purposes. The term is used especially of such congregations as live under the jurisdiction of the Anglican Church. The monastic life for women has a hist. going back almost as far as that of religious communities for men. It dates to pre-Christian times. In the early ages of the Church the object of religious women living in community was their own sanctification by means of retirement from the world, prayer, and meditation. In course of time they enlarged their sphere of work and founded hospitals and penitentiaries, and schools. So far as the Church of Rome is concerned, personal sanctification is still the primary end of all religious life, to be sought through vows and charitable works as the prin. means. All modern forms of community life for women in the Anglican Church are modelled upon the organisation of the great religious orders of the Middle Ages and those which have evolved from them to-day. Prior to the Reformation in England and the disestablishment of religious houses, the majority

of these organisations for women took their rise as 'second orders' of such bodies as the Dominicans and the Benedictines. The following are some of the best known of the old religious orders for women: Benedictines (sixth century), Poor Clares, i.e. Franciscans (1212), Bridgettines (1344), and Carmelites (re-formed 1568). With the dissolution of the religious communities in England in the reign of Henry VIII. conventual life for women was extinguished, though some convents continued to exist in exile in France and Belgium. There were one or two attempts to revive religious orders for women in England, but it was not until the beginning of the

built by Sixtus IV. (hence the name) in 1473, and is famous for the paintings which cover its walls and vault, notably those by Michelangelo: 'The Creation,' 'The Deluge,' and 'The Last Judgment,' and masterpieces by Botticelli, Perugino, Pinturicchio, and Rosselli. The Sistine Choir, which sings in the S. C., is one of the most famous in the world.

Sistova, Svistov, or Sviditov, tn. of S. Bulgaria, on the Danube. It is an important commercial centre, exporting wine and grain and importing petroleum. A peace was signed here in 1790 by which the Austro-Turkish boundary was determined. Pop. 15,000.



THE SISTINE CHAPEL, VATICAN

Anderson

nineteenth century that S. reappeared in the Anglican Church. An interest in such establishments revived about 1845, and was assisted by the influence of the Tractarian movement. The S. which came into existence no longer looked upon the ascetic life as their ideal, their purpose was generally a charitable one. Nursing and good works were rather their objects than a cloistral and meditative life. In this they were following the development initiated among Rom. Catholic communities by the foundation of the Sisters of Charity under St. Vincent de Paul (1576-1660). See also CONVENT; DEACONESSES; NUN.

Sisteron, tn. of Forcalquier, France, in the lower Alps. It has an old cathedral and a ruined citadel which help to preserve a medieval aspect. Pop. 3300.

Sistine Chapel, private chapel of the pope in the Vatican at Rome. It was

Sistrum, Egyptian musical instrument of a primitive order, made out of a piece of metal bent into the shape of a shell and covered with a cross-piece. This latter was equipped with tongues which struck the metal when the S. was shaken. The instrument is supposed to have been invented by Isis. It is in use also in Africa.

Sisyphium, see ALLIARIA OFFICINALIS. Sisyphus (Σίσυφος), in Gk. mythology, the son of Æolus and Enarete, and king of Corinth. He appears to have promoted navigation and commerce, but to have lived a wicked life, for which he was punished in the lower world, where he was compelled to roll a huge stone up a hill, which, when it reached the top, always rolled back.

Sitapur, tn. in the S. dist., India, 52 m. N.W. of Lucknow. Pop. 25,500; (dist.) 1,293,600.

Sitka, tn. and former cap. of Alaska, U.S.A., situated on the W. coast of

Baranov Is., facing S. Sound, 100 m. S.S.W. of Juneau. In 1804-67 it was the Russian cap., and then became the cap. of the unorganised ter. In 1906 Juneau superseded it as cap. of Alaska. The chief features of interest are the Russo-Gk. church (dating from 1816), marine barracks and hospital, magnetic observatory, and sev. educational institutions. Pop. 1900.

Sitka Island, see BARANOV ISLAND.

Sittang, riv. of Burma, having its source N. of the former Brit. ter. which it enters at about Toungoo and then flows southward to debouch into the gulf of Martaban where it broadens so rapidly that its waters cannot be distinguished from those of the gulf. The S., which is nearly 400 m. long, is navigable throughout its length by large boats and steam launches. See also under BURMA, SECOND WORLD WAR, CAMPAIGNS IN.

Sitten, see SION.

Sittingbourne, mrrkt. tn. of Kent, England, 10 m. E.S.E. of Rochester; originally a place of call for pilgrims to Canterbury. It has paper-mills, brick and cement works, and oyster fisheries, and is the centre of an important fruit-growing dist. Pop. with Milton 21,700.

Sitting Bull (1835-90), famous chief of the Dakota Sioux Indians, son of Jumping Bull. During the civil war he led bands which attacked white settlers in Iowa and Minnesota. He finally made peace with the gov., but broke his word and refused to retire to the reservation. This led to a campaign in which Gen. G. A. Custer and his entire command of Amer. soldiers were massacred. S. B. fled to Canada, but returned in 1881 and lived at Standing Rock Agency. In 1883 trouble with the Indians was feared because of their dissatisfaction about the sale of some of their lands. S. B. was, therefore, taken into custody, Dec. 15, 1890, and was killed in a fight that followed an attempt by the Indians to rescue him.

Sitwell, Edith Louise (b. 1887), Eng. poet, b. at Scarborough, Yorkshire, daughter of Sir George Reresby S. E. S. began her career as a poet modestly with *The Mother and Other Poems* (1915), a vol. which showed Fr. influence, especially that of Baudelaire. In 1916 the first vol. of *Wheels* appeared, an ann. anthology of verse, ed. by E. S., until discontinued in 1921. It was a vol. to which many young poets, including E. S.'s brothers, contributed, and marked the first bid for the unusual in subject and style characteristic of E. S.'s poetry. On June 12, 1923, the series of poems entitled *Facade* was recited by the poet at the Aeolian Hall to the accompaniment of 'musical decorations,' by Wm. Walton, and this method of interpretation (music and a hidden voice mostly in monotone) proved well adapted. E. S.'s poetry is founded on a sensitive understanding of Eng. metrical tradition (as shown by her anthology, *Pleasures of Poetry*, 1930-31), and its characteristics are the use of bright images, transitory with the qualities of a passing dream, and a confusion of sensory epithets which gives scope for surprising and beautiful word

painting. Other books are (poems) *Clown's Houses* (1918); *The Wooden Pegasus* (1920); *Bucolic Comedies* (1923); *The Sleeping Beauty* (1924); *Troy Park* (1925); *Twentieth-century Harlequinade and Other Poems*, with Osbert S. (1928); *Elegy on Dead Fashion* (1927); *Gold Coast Customs* (1929); *Collected Poems* (1930); *Street Songs* (1942); and *The Canticle of the Rose* (1948); (prose) *Poetry and Criticism, an Essay* (1925); *Alexander Pope* (1930); *Bath* (1932); *The English Eccentrics* (1933); *Aspects of Modern Poetry* (1934); *Victoria of England* (1936); *I Live under a Black Sun* (1937); and *Fanfare for Elizabeth* (1946).

Sitwell, Sir Osbert (b. 1892), Eng. poet and novelist, b. in London, brother of Edith S. (q.v.). Educated at Eton, he entered the Sherwood Rangers, a yeomanry regiment, in 1911; he was transferred to the Grenadier Guards in 1912, and served with them in the First World War. The war and subsequent peace excited O. S. to the bitter strife, both in prose and verse, with which his name is chiefly associated. His first vol. of satires, *Argonaut and Juggernaut* (1919), was followed by *The Winstonburg Line* (1919), an attack on Winston Churchill's projected campaign in N. Russia. O. S. contested Scarborough as a Liberal in the 1918 general election. In his two novels, *Before the Bombardment* (1926) and *The Man Who Lost Himself* (1929), he claims to have originated the 'novel of reasoned action,' which seeks to discover a balance between the reason, unreason, and previous hist. 'in which each action, event, and thought is founded.' He associated with his brother Sacheverell in a campaign for mental fitness, 1937-38 (youth, mind, and beauty). O. S. is at his best in sympathetic and yet satirical verse-portraits such as all the vol. *England Reclaimed* (1927). Other books are *Who Killed Cock Robin? Remarks on Poetry* (1921); *Out of the Flame, Poems* (1923); *Triple Fugue and Other Stories* (1924); *Dumb Animals and Other Stories* (1930); *Collected Poems* (1931); *Winters of Content* (1932); *Dickens* (1932); *Miracle of Sinai* (1933); *Penny Foolish* (1935); *Those were the Days* (1938); *Trio* (with Edith and Sacheverell S., 1938); *Two Generations* (1940); *Open the Door* (1941); *A Place of One's Own* (1941, filmed 1944); *Selected Poems* (1943); *A Letter to My Son* (1944); *Left Hand, Right Hand* (autobiography, 1944); and *Great Morning* (1948).

Sitwell, Sacheverell (b. 1897), Eng. poet and essayist, younger brother of Edith and Osbert S. (q.v.), b. at Scarborough. He was educated at Eton. His first book of poetry, *The People's Palace*, was pub. in 1918, and has been followed by many others. S. S. is foremost as a poet, and his work has a classical deliberation and an unhurried measure. S. S. has written variations on themes by Marlowe, Lyly, Herrick, Milton and Pope. His poetry includes *The Hundred and One Harlequins* (1922); *The Thirteenth Caesar* (1924); *Exalt the Eglantine* (1926); *The Cyder Feast* (1927); and the complete version of *Dr. Donne and Gargantua* (1930), which

shows the scope of his intellectual capacity. His prose works consist of *German Baroque Art* (1924); *All Summer in a Day* (an autobiographical fantasia, 1926); *Southern Baroque Art* (1927); the three vols. that comprise *The Gothic North, Spanish Baroque Art*, and a vol. of short stories, *Far from My Home* (1931). S. S. is the founder and secretary of the Magnasco Society, which exists to further the appreciation of seventeenth- and eighteenth-century It. art. Later works: *Life of Liszt* (1934); *Dance of the Quick and the Dead* (1936); *Conversation Pieces* (1936); *La Vie parisienne* (1937); *Roumanian Journey* (1938); *Pollergists* (1940); *Sacred and Profane Love* (1940); *Primitive Scenes and Festivals* (1942); *The Homing of the Winds* (1942); *Splendours and Miseries* (1943).

Siut, see ASYÖT.

Siva (Sanskrit, kindly, auspicious), also known as Mahadeva (great god), the third member in the Hindu Trimurti (g.r.), representing the principle of destruction. He is the god of asceticism, stern and uncompromising, and the favourite deity of Hindu ascetics. His symbol is the *linga*, emblematic of creation, following destruction. He is known by numerous names, and is identified with various local gods; in some phases he is a jovial free-liver, the god of dancing, and a magician.

Sivaji (1627-80), founder of the Marhatta power, b. at Joonere, the son of a vassal of the sultan of Bijapur. In 1674 he was proclaimed maharajah, and three years later led a Marhatta army through Golconda, establishing a kingdom which, later, was represented by the rajah of Tanjore.

Sivan, Jewish month, third according to the anc. biblical calendar, and ninth in the Jewish post-exilic calendar. S. corresponds to May-June. The name S. is post-biblical.

Sivas, tn. of Asiatic Turkey, cap. of the vilayet of the same name. It is on the Kizil Irmak, and is a great trade centre for grain, wine, and woollens. It lies in a fertile dist. rich in minerals. Pop. 45,400; vilayet 494,400.

Sivash, see AZOV, SEA OF; CRIMEA.

Siwah (anc. Ammonium), oasis in N.E. Africa, containing sev. lakes, the tn. of the same name, 280 m. W.S.W. of Alexandria, and the tn. of Aghourmi. It yields dates and olives.

Six Acts, series of repressive statutes passed in 1819 as a check to the various democratic associations that sprang up in England after the Fr. Revolution, one of which forbade any meeting of more than fifty persons unless six days' notice was first given by seven householders to a magistrate. The other five prohibited the use of arms and the instruction of persons in military exercises, increased the punishment of seditious libel, and imposed stamp duties on certain pubs.

Six Articles, Statute of, see ARTICLES, THE SIX.

Six Counties, see NORTHERN IRELAND.

Six Nations, see IROQUOIS.

Sixtus name of five popes, the most

important of whom were Sixtus IV. and Sixtus V.:

Sixtus IV. (*Francesco della Rovere*) (1471-84), b. in 1414 near Savona; he was the successor of Pope Paul II., having already become general of the Franciscan order. He supported the Pazzi in the conspiracy against Lorenzo de' Medici. The quarrel was settled, however, when his ally, the king of Naples, went over to the Medici. He encouraged the spread of learning, built the Sistine Chapel (q.v.) and the Sistine Bridge, and was a patron of all the arts. See L. von Pastor, *Popes from the Close of the Middle Ages* (trans. 1895).

Sixtus V. (*Felice Perelli*) (1585-90), b. in 1521; Franciscan preacher, and prof. of theology at Rimini and Siena. His rule was characterised by a number of good reforms. He also built the Vatican library, and pub. a new ed. of the Septuagint and of the Vulgate. He fixed the number of cardinals at seventy.

Sizar, student of Cambridge or Dublin Univs. whose fees are reduced because he holds a sizarship, i.e. is entitled to certain benefactions. In former days this meant an allowance of food and drink, and was termed 'size,' in return for which he rendered certain services. The equivalent at Oxford is a servitor. Oliver Goldsmith was a S. of Trinity College, Dublin.

Size, see GLUE.

Siælland, or Seeland, see ZEALAND.

Sjambok (Dutch from Malay *Chambok* and Persian *chubuk*, whip), South African whip made from rhinoceros hide.

Skagerrak, arm of the sea situated between Norway and Jutland, connecting the Baltic and North Seas by means of the Kattegat. It varies between 70 and 90 m. in width, and is about 155 m. long.

Skagway, seaport of Alaska on the Skagway R. It was founded about the year 1497, and is the means of taking supplies to the Yukon mining dist. A railway runs thence to White Horse. Pop. 500.

Skalds and Skaldic Poetry. Skald is the Icelandic word for poet and especially court poet. Skalds certainly existed in the heroic period and perhaps composed the epics which date from the Migration of Peoples. But in historical times they composed not epic but occasional verse, usually commissioned by the patron at whose court they lived. The earliest named skald passages of whose work survive is Tjodolf of Kvín, who fl. 870 in the train of Harald Fairhair. Though predominantly Icelandic by birth, Skalds frequented all the Scandinavian courts of the Viking Age; thus Egil was received both by Eric Bloodaxe, the pirate king of York, and Athelstan, king of Wessex. No separate MSS. of their works remain but they are quoted extensively in the sagas.

Skaldic poetry comprises the short narrative episode (kvitha) celebrating the political fortunes of the patron, the love poem, the satire, the 'flyting' or scurrilous dialogue, and the lament, of which last the most famous example is Egil's *Sonnatorrek* ('On the Loss of my Sons'). The art was

practised with more or less skill by the whole of the cultured (though not literate) class in the Viking Age, and it was the custom to utter extempore verses at moments of deep emotion, despite the extreme complexity of the verse-forms. Snorri's (*q.v.*) *Prose Edda* enumerates 102 separate metres, the commonest and simplest being *drottkvætt* ('court metre') a stanza of four couplets linked both by alliteration and assonance. In the more complicated forms scansion was both by stress and quantity, and the verse contained rhyme, external and internal. This and the fact that imagery took the form of elaborate 'kennings' (metaphors) render skaldic poetry almost untranslatable into modern, especially into uninflected language. Skalds and their art died out about 1250, when Fr. literary influence finally penetrated to Norway. See G. Vigfusson and F. York Powell, *Corpus Poeticum Boreale*, 1883.

Skara, *tn.* of Sweden, 75 m. N.E. of Gothenburg, between the Vätter and Väner Lakes. It is well known for its veterinary school and its library. Pop. 8200.

Skaraborg, *S. lan* of Sweden, lying between Lakes Vänern and Vätter. Dairy farming is carried on, and there are munition works at Karlsborg. Area 3269 sq. m. Pop. 217,300.

Skat, *Ger. card game*, invented towards the beginning of the nineteenth century. It still has a great vogue in central and N. Germany, and is essentially a Ger. game, played with special Ger. cards. These number thirty-two, and are of different colours; each of the colours has a different value, and the cards are counted according to their colours and individual value. The game consists in obtaining 61 points for a single game, 89 for a double, and 120 for the full game.

Skate, name given to many species of the elasmobranch family Rajidae, which occurs in all temperate seas. The body of the fish is in the shape of a flattened disk, formed by its union with the broad, fleshy pectoral fins; the tail is slender and usually bears two dorsal fins. The egg cases are oblong, and are commonly known as mermaid's purses. See well-known species are *R. radiata*, the starry S.; *R. oryrhynchus*, the long-nosed S.; and *R. levis*, the barn-door S.

Skating, pastime of great antiquity. The earliest skaters appear to have been the Norsemen, who used bones tied to their feet with strips of hide. One of the first medieval writers to refer to S. was the Dan. historian, Saxo Grammaticus, in 1134. For many years polished bones were the only known form of skate. The first mention of this in England is probably in a trans. of Fitz-Stephen's *Description of London*, pub. in 1180. Skates with metal blades were believed to have been introduced into this country from Holland about 1600. Britain's oldest S. organisation, the Edinburgh S. Club, was formed in 1642. The famous diarists, Pepys and Evelyn, both mention S. which was practised on the lake in St. James's Park, London. The first known artificial

ice rinks were opened in 1876. In March of that year a 'Glaciarium' was constructed in King's Road, Chelsea. At the present time there are approximately thirty artificial ice rinks in Great Britain.

Ice S. is divided principally into two categories, speed S. and figure S. Speed races are contested in indoor rinks, as well as on the open lens. Speed S. was popular in England many years before the formation of the National S. Association in 1879; the oldest record of a Brit. race is of one held on Feb. 4, 1763. Figure S. may be defined as the drawing of designs by a skate on the ice, the result of movements of the body. The fundamental movements of all figure S. are forwards and backwards on the forward and outside and inside edges, and the backwards, outside and inside edges, and turns to the left and right. The skates used differ slightly from those used for speed. The blade, about $\frac{1}{2}$ in. in thickness, curves sharply for some distance in front of the stock. For figure S. the blade is slightly thicker and does not project beyond the stock. Tubular skates are used chiefly for ice hockey. Pair dancing on ice is widely practised. S. shows are now used as theatrical entertainment by means of portable tanks. In America this side of S. has developed into a vast business.

The 1948 Olympic S. champions were: men—Richard Button (U.S.A.); women—Barbara Ann Scott (Canada); pairs—Micheline Lannoy and Pierre Baugnot (Belgium). The 1949 Brit. champions were: men—Michael Carrington; women—Joanette Alwegg; pairs—John and Jennifer Nicks. World champions: men—Richard Button (U.S.A.); women—Aja Vrzanova (Czechoslovakia); pairs—Andrea Kekecs and Elekiraly (Hungary).

Roller skates with wheels instead of blades were first used on the roads in Holland in 1770. Skates with rollers or small wheels were said to have been introduced into a scene of Meyerbeer's *Prophète* in Paris on April 16, 1849. In 1863 four-wheeled roller skates were invented in America, and the first Amer. boot began in 1875. England shared in this boom. Roller S. is also used theatrically on a large scale in America with noiseless and dustless wheels made of rubber. As a guide to comparative speed, the 1 m. indoor record on ice is held by H. V. Tipper, who completed the distance in 2 min. 48 sec. in 1939. The 1-m. indoor record on rollers is held by A. R. Eglinton. He covered the distance in 2 min. 18 sec. in 1918, and this record has stood since then. See I. Brickman, *The Art of Skating*, 1926; T. D. Richardson, *The Complete Figure Skater*, 1948, and *Ice-Rink Skating*, 1949.

Skean-dhu, or **Sgean-dhu** (Gaelic, black knife), short knife, usually with an ornamental handle and sheath worn with Highland dress and carried in the right stocking.

Skeat, *Walt* . *William* (1835-1912), Eng. philologist, b. in London, second son of Wm. S., architect. He was educated at King's College School, Highgate School, and Christ's College, Cambridge. Ordained in 1860, and abandoned the ministry on

account of throat trouble, and returned to Cambridge to study, being in 1878 appointed prof. of A.-S. He was one of the founders of the Eng. Dialect Society, editing many works therefor; and, in addition to numerous philological articles in magazines, he pub. the texts of Langland's *Piers Plowman* (1867-85); *An Etymological Dictionary of the English Language* (1882); *The Student's Chaucer* (1895); *Primer of Classical and English Philology* (1905); and *The Science of Etymology* (1912).

Skegby, tn. of Nottinghamshire, England, on the E. Region railway, 8 m. from Nottingham. It is in the heart of a coal-mining dist.

Skegness, seaside resort of Lincolnshire, England, 5 m. N.E. of Wainfleet. Wm. Butlin estab. his first holiday camp at S. Pop. 10,700.

Skeleton, rigid structure for the support or protection of the softer tissues of a plant or animal. When the S. is external, as in the shells of molluscs, it is called an exoskeleton; when it forms a framework for the support of surrounding tissues, it is known as an endoskeleton. In man, the medial supporting structure is the spine; it consists, in the infant, of thirty-three *vertebrae*, of which the upper seven are *cervical*, or neck *vertebrae*; the next twelve are *dorsal*, or chest *vertebrae*; the next five are *lumbar*, or loin *vertebrae*; the next five *sacral*, or pelvic *vertebrae*; and the last four *coccygeal*, or caudal *vertebrae*. In the adult the *sacral vertebrae* unite to form the *sacrum*, and the *coccygeal vertebrae* unite to form the *coccyx*. The spine supports the skull, which consists of twenty-two bones, eight cranial and fourteen facial, of which only the jaw-bone is movable. The organs of the chest are protected by the ribs, which articulate with the *vertebrae* behind; seven of them on each side unite with the *sternum*, or breast-bone, in front; the next three do not unite directly with the *sternum*, and are called false ribs; while the last two have free extremities in front, and are called floating ribs. The upper limbs depend from the shoulder-girdle, which consists of the *clavicle*, or collar-bone, in front, and a flat, triangular bone called the *scapula*, or shoulder-blade, behind. Articulating in the glenoid cavity of the *scapula* is the *humerus*, or bone of the upper arm; at its lower extremity the *humerus* possesses a *trochlea* or pulley for the *ulna*, and a small head for articulating with the *radius*. The *ulna* and *radius*, the bones of the forearm, articulate with the wrist or *carpus*, which consists of eight bones in two rows. Then come five *metacarpal* bones, which articulate with the two *phalanges* of the fingers. The lower limbs depend from the *pelvis*, each half of which consists of three bones, the *ilium*, *ischium*, and *pubis*, fused together and firmly attached to the *sacrum*, and supporting the viscera. The arrangement of bones in the legs is somewhat similar to that of the arm bones. The *femur*, or thigh bone, is the longest bone in the body. The bones of the lower leg are the *tibia*, or shin bone, and the

slenderer *fibula*. These articulate with the femur and the sesamoid *patella*, or knee-cap, above, and with the bones of the *tarsus*, or ankle, below. The foot also possesses five *metatarsal* bones and the *phalanges* of the toes.

Skelligs, The, three is. off the coast of co. Kerry, Eire, 9½ m. S.W. of Valentia Is. Great Skellig possesses ruins of a monastery.

Skelmersdale, tn. of Lancashire, England, 7 m. W. of Wigan. It is engaged in brick making, and the manuf. of shoes. Pop. 6,200.

Skelton, John (1460-1529), Eng. poet, educated both at Oxford and Cambridge. His first recorded verses were composed on the death of Edward IV. (1483). He was appointed tutor to the Prince of Wales (afterwards Henry VIII.), and, taking holy orders, in 1498, was given the living of Diss. His best-known works are the *Ballade of the Scotische Kynge* (1513); *Colyn Cloute* (1532-37); *The Tunnyng of Elynor Rummynge* (1512-1548); and *The Boke of Phyllip Sparowe* (1542-46). The Rev. Alexander Dyce's ed. of *The Poetical Works of John Skelton* in two vols. appeared in 1813; a modernised and complete ed. was ed. by P. Henderson, 1931. See I. A. Gordon, *John Skelton: Poet Laureate*, 1911, and H. L. R. Edwards, *Skelton: the Life and Times of an Early Tudor Poet*, 1919.

Skelton, tn. in the N. Riding of Yorkshire, England, 10 m. E. of Middlesbrough. There are ironstone mines. Pop. with Brotton (1931), 13,000.

Skene, William Forbes (1809-92), Scottish historian, b. at Inverie, Inverness-shire. He was educated at Edinburgh, in Germany, and at St. Andrews, and in 1832 became a writer to the signet. In 1881 he was appointed historiographer-royal for Scotland. His chief works are *The Highlanders of Scotland: their Origin, History, and Antiquities* (1837); *Celtic Scotland: a History of Ancient Alban* (1876-80); and *Memorials of the Family of Skene of Skene* (1847).

Skerries: 1. Small seaport of Eire, 18 m. N. by E. of Dublin. It has a good pier and sea bathing. Pop. 2,100. 2. Sev. groups of rocky islets round the coast of Great Britain. The name is specially applied to a group of islets off the N.W. coast of Anglesey, in the Irish Sea, with a lighthouse.

Skerryvore, rock in the Hebrides, Scotland, 12 m. S.W. of Tiree, long a menace to mariners. A lighthouse was erected in 1814, designed by Alan Stevenson, on the lines of the Bell Rock Lighthouse, constructed by his father, Robert Stevenson. The lighthouse is 134½ ft. high, and the revolving light can be seen 18½ m. out at sea.

'**Sketch**,' Illustrated London weekly paper, founded in 1892 by Sir Wm. Ingram with Clement Shorter as its first editor. Shorter gave up the editorship after seven years' tenure, and was succeeded by Capt. (now Sir) Bruce S. Ingram, also editor of the *Illustrated London News*. The S. contains finished illustrations by leading artists, articles and criticisms on

current theatrical, cinema, and television life with elaborate portraits of leading actors and actresses, and photographs of the most striking scenes in London plays, biographies, and caricatures. It contains also society notes and paragraphs on sporting events. In 1946 Capt. J. E. Broome succeeded Capt. Ingram as editor.

Skewen, township of Glamorganshire, Wales, on Swansea Bay, 193 m. from London, on the W. Region railway. There are coal-mines in the vicinity. Its industries include also oil refining and copper smelting.

Ski. The modern S. has developed from various forms of snowshoe used in Scandinavia and central Asia since prehistoric times. S. are generally made of hickory or ash, though recently experiments have been made with aluminium and laminated S. For general purposes the length of the S. should equal the distance between the ground and the palm of the hand extended above the head; the width should be about 4 in., and the thickness about 1 in., tapering at both ends, the front being slightly upturned and pointed. Most S. have steel edges, to grip hard snow and icy surfaces. The S. is attached to the foot by means of a binding, originally a leather thong, now generally a steel cable. It should be possible to kneel on the S. after the binding has been fastened; the widespread popularity of the rigid racing binding, though it gives greater control, is responsible for the increase in broken legs in recent years. Two sticks, usually of aluminium or bamboo, ending in circular thonged 'baskets' to prevent them from sinking into the snow, are held one in each hand, and are used to preserve the balance, and to assist in climbing, turning, and stopping. The sliding surface of the S. is covered with a mixture of waxes varying according to snow and weather conditions. Strips of sealskin are used to prevent slipping backwards when climbing. A lunging movement is used on the flat and on easy uphill gradients; side stepping and 'herring-boning' can also be used for ascending short steep slopes. In straight running downhill the S. are kept parallel and close together, one S. slightly in front of the other. The snow-plough or stem position is also used. The five chief skiing turns are the kick, jump, stem, telemark, and christiana. The kick turn is chiefly used in climbing; the jump turn is used only on steep difficult slopes; the stem is a steered turn used on hard snow; the telemark is also a steered turn used in heavy soft snow; the christiana is a skid turn, and the fashionable form of it is the most popular turn to-day. The stem, telemark, and christiana are used as stop turns. Turns are executed by shifting the weight and swinging the body. In all skiing positions it is essential to bend the knees and keep the hands forward.

Throughout hist. there are references to skiers and to the use of S. troops, which also formed part of the armies of the Second World War, but skiing as a sport only began to develop in the middle of the nineteenth century in Norway. Early in the twentieth century, as the result of the

enthusiasm of the Alpine pioneers Paulcke, Zdarsky, Bilgeri, Arnold Lunn, and Hannes Schneider, ski-ing spread all over the world, and the governing body of the sport, the Fédération Internationale de Ski, now consists of thirty-two national associations, including the S. Club of Great Britain, to which forty-eight Brit. S. clubs are affiliated.

S. touring was the aim of the pioneers, and still appeals to those who like to get away from the beaten tracks which result from the ever-increasing number of mt. railways. Ski-joring, that is, ski-ing behind a horse, has a limited appeal and use in some countries. Modern S. technique, as taught in S. schools all over the world, is based on the development of competitive ski-ing.

Ski-jumping, on specially prepared jumping hills, on which jumps of 107 metres have been recorded, and long distance racing, were first developed in Norway, where the Holmenkollen meeting is the chief international event in these two branches of competitive ski-ing. Downhill racing, in which speeds of 84 m.p.h. have been recorded, and slalom racing were found to be more suited to the steeper Alpine terrain, and were developed by the Brit. and Swiss, particularly by the Kandahar S. Club and the Swiss Univ. S. Club, at Murren between the two wars, enthusiasm for these types of races spreading gradually to Austria, Poland, Germany, Italy, France, Norway, and America. As the results of the efforts of Arnold Lunn, the inventor of the modern slalom, a race through groups of flags designed to test control at high speed, downhill and slalom racing were recognised by the Fédération Internationale de Ski, and included in the world championship and the Olympic Games, the Brit. rules becoming the international racing rules. The Brit. also inaugurated the blue ribbon of downhill racing, the Årlberg-Kandahar; Kandahar cups are now raced for in Canada, the U.S.A., Chile, and Norway. The Brit. were also pioneers in ladies' racing, winning two world championships, and have been successful in international races restricted to amateurs with the 'Kent' qualification. Ski-ing in Scotland, though often attractive to the holiday skier, is hardly adequate as a training ground for racing, and Brit. hopes turn to the unusual facilities for ski-ing now available in the army. See V. Caulfield, *How to Ski*, 1911; A. Lunn, *Alpine Ski-ing at all Heights and Seasons*, 1921, and *A History of Ski-ing*, 1928; P. Lunn, *High Speed Ski-ing*, 1935, and *A Ski-ing Primer*, 1948; and A. Fawcus, *Ski-ing Simplified*, 1949.

Skiatron Valve, see under VALVES.

Skiiberseen, mrrkt. tn. and seaport in co. Cork, Munster, Eire, on the R. Ilan, 18 m. S.W. of Bar'ry. In the graveyard of Abbeystrowry, m. distant, are the great mounds of the mass burials of 1847 famine victims. Pop. 2500.

Skiddaw, mt. in Cumberland, England, 34 m. N. of Keswick. Height 3054 ft.

Skien, seaport tn. in the prov. of Bratsberg, Norway, 62 m. S.W. of Oslo, the pr.

of Ibsen. There are iron ore and copper mines, chemical, furniture, wood pulp and paper works, etc. Pop. 18,300.

Skimmer, or **Scissor Bill** (*Rhynchops*), genus of marine birds with bills the lower mandible of which is longer and flatter than the upper, and fits into it like a knife blade into its handle. *R. nigra*, common in the Atlantic, is about 20 in. long, and is remarkable for its skimming flight along the surface of the sea.

Skin, The, consists of two layers, the *epidermis*, *cuticle*, or *scarf-skin*, and the true *S.*, *corium* or *cutis vera*, underneath. The former consists of layers of epithelial cells, the outermost of which are dead scales, the lower actively multiplying to replace the scales worn or washed away; the epidermis is bloodless, but is nourished by lymph and varies much in thickness, being especially thick in the palms of the hands and soles of the feet. Horns, hoofs, nails, hairs, and feathers are all epidermal outgrowths. The corium or dermis is a layer of fibrous tissue merging gradually into the lower subcutaneous tissue, it rises at its surface into conical *papillæ* arranged in rows and containing loops of blood capillaries, while many contain also nerve-endings, the *tactile corpuscles*. Rising from the dermis are the hairs and hair follicles, attached to which muscular fibre is found, the *arrector pili* muscle which makes the hair stand 'on end' and causes 'goose-flesh,' and both *S.* are traversed by the ducts of the sweat glands. Pigment granules are found in the cells, being especially noticeable in the Negro. The *S.* is renewed continually and imperceptibly, but in some animals it is cast as a whole or in large portions. The *S.* is marked by fine furrows, seen most easily on the finger tips, and coarse furrows, seen in the neighbourhood of joints.

Perspiration—The *sebaceous glands* lodged in the corium pour their secretions of disintegrated cells into the hair follicles, and are found wherever there is hair, which is thus naturally lubricated. The *sweat glands* are seated deeply in the corium, the ducts there terminating in coiled blind ends surrounded with blood capillaries lined with cubical cells which separate the sweat from the lymph bathing them. This exudes at the outer end of the ducts and evaporates as insensible perspiration, if copious drops exude. The glands are provided with special regulating nerves. Sweat is usually alkaline, colourless, and salt. Urea is found among the solids.

Functions—The *S.* is excretory; it aids the kidneys by relieving them when there is much impurity in the body, or when the kidneys are unhealthy. It regulates the temp. of the body, being the main channel for loss of heat; the evaporation of sweat also cools the body. It is respiratory, the gaseous interchange being about 1/200 that of the lungs; but in many thin-skinned animals, e.g. the frog, this function is largely increased. It is absorbent; thirst is assuaged by immersion in water; oils and drugs rubbed in the *S.* are absorbed, and drugs are sometimes administered in this way. As a protection against

heat, cold, draught, and of the cells and fluids below against damage, the *S.* is of obvious importance, but its exclusion of germs from the body is often overlooked, though that is the real object of covering up cuts, etc. As an organ of sensation its function is of paramount importance.

Diseases.—*Itches* occur in diseases such as scarlet fever and measles, or during teething, or accompany digestive disorders. Although irritation can be allayed by treatment with ointments, etc., the more remote cause must be combated. *Eczema* is both chronic and acute, in the latter form the *S.* is red and covered with papules which become vesicles, forming scales or remaining 'weeping', in the former the *S.* hardens, thickens, and becomes covered with scales or cracks may develop. There is generally itching, and scratching only aggravates the disease. It is not contagious. It is difficult in most cases to assign the cause, but any form of irritation may induce it in persons predisposed such as gouty and strumous (scrofulous) persons. In all cases the digestive and natural functions of the body must be the first care. Soap must not be used on the affected parts, which may be washed with oatmeal or rice water; zinc or zinc and boracic ointment may be applied, or carbolic ointment in slight cases. Small doses of arsenic are sometimes administered and scales or thicknesses are removed by caustic potash or some other irritant, but this should of course be only under medical advice. *Erysipelas* (St. Anthony's fire Rose) commences with painful swelling of the *S.*, redness, and fever, giving place to vesication and desquamation of the epidermis, and to deeper suppuration. A streptococcus is found in the lymph spaces, which become enlarged and the inflammation spreads. This inflammatory reaction brings about degenerative changes in the streptococci, and advantage has been taken of this in the treatment. Iodine, cantharides, oil of mustard, etc., will set up a similar reaction, and by treatment with these the spread of the streptococci is prevented. Good results are obtained by the use of sulphonomides or penicillin. The head and face are most often affected, and, especially in these cases, the subject is liable to further attacks. *Erysipelas* tends to be epidemic, but modern antiseptic treatment has made isolation easy. There is danger for persons in contact with the case; if the *S.* should anywhere be wounded, it is usually at some such place that the disease commences. Other bacterial diseases affecting the *S.* are syphilis (*q.v.*), tuberculosis, impetigo, and carbuncle. *S.* diseases may also be caused by plant and animal parasites; ringworm is due to a fungus, and scabies to an animal parasite. Birth-marks, such as mole or soft naevus, grow from the epidermis; hard moles originate in the malpighian layer at the base of the epidermis. *Drug eruptions* are *S.* eruptions following the use of certain drugs; salicylate of soda, copaiba, arsenic, and iodide of potassium produce such symptoms as erythema, papules, or weals as in nettle-rash. They are due to

the efforts of the S. to eliminate the poison, and pass away when the drug is discontinued. *Skin-grafting* has been largely practised of late years; it consists in transplanting S. from one part of the body, or from another body, sometimes of another animal, to some part where the S. has been removed. The thickness of S. transplanted varies, but it must be healthy and contain the living cells. The surface of the wound is carefully cleaned and prepared, and the new S. takes root and covers the wound more quickly than would be done by natural healing. See also LUPUS; PHLYMIAIS; RODENT ULCER; and SINGLES. See W. J. Highman, *Dermatology*, 1921; J. H. Sequiera, *Diseases of the Skin*, 1926; R. C. Low, *Common Diseases of the Skin*, 1927 (3rd ed.), 1939; and R. M. B. MacKenna (ed.), *Modern Trends in Dermatology*, 1948.

Skink, or *Scincus officinalis*, species of Scindidae found in N. Africa. This lizard is about 6 in. long, is of a dark red colour, has four limbs, and burrows in the sand, in which it dwells.

Skins, or Pelts, see FURS.

Skipton, tn. and co. constituency in W. Riding of Yorkshire, 20 m. N.W. of Bradford. It returns one member to Parliament. Manufs. include cotton, rayon, and woollen goods. The grammar school was founded in 1548 by Wm. Emysted. The castle, parts of which date from the eleventh century, was a Civil war stronghold. Pop. 13,300.

Skirret, or *Sium asiarum*, species of Umbelliferae related to the Brit. water-parsnip. Its roots are tuberous, and are edible when boiled.

Skittles. This game, which dates from the fourteenth century at least, was originally introduced from Germany. It was at one time called 'kails.' Nowadays it is played in a specially prepared place, or 'alley,' as it is technically called. At one end of the alley the S., which are nine in number, are set up; they are made of wood, are about 1 ft. high, shaped in rough cigar fashion, and weigh from 7 to 9 lb. The 'pins,' as these pieces of wood are called, are set up in the form of a square, one angle of which faces the players, who stand at the other end of the alley, about 21 ft. away. The player hurls at them a flat wooden ball, which weighs from 10 to 14 lb. The game is played between two opponents or two opposing sides. The simplest game consists in throwing at the pins with the ball and scoring in the following manner: if all the pins are felled with the first throw, three points are scored; if with two throws, two points are scored; with three throws, one point; and with more, none. There are, however, many varieties of this game. Dutch S. differ in that the ball is bowled down a groove and has a slight bias, and English S. is a parlour game, played on a table with miniature S., and usually an ivory ball. See also under BOWLING; BOWLS. See *Cassell's Book of Sports and Pastimes*, 1907.

Skodra, see SKUTARI.

Skopin, tn. in the Ryazan Region of the R.S.F.S.R., 54 m. S. of Ryazan. It has

flour mills, oil mills, and tanneries, and trades in agric. produce.

Skopje (Skopje), or Uskub, cap. of Macedonia, Yugoslavia, and cap. of the old kingdom of Serbia. It stands on the R. Vardar, 100 m. N.W. of Salonika, and is one of the most important centres of communication. It has leather, dyeing, and weaving industries, and chrome, magnesite, saltpetre, and antimony are found. It figured prominently in the Balkan war of 1912-13 (q.v.), and was taken by the Bulgarians, 1915. It was the bp. of Justinian, and has a citadel and Rom. aqueduct. Pop. 91,500.

Skowhegan, co. seat of Somerset co., Maine, U.S.A., on Kennebec R., 45 m. W. of Bangor. It has a public library, and manufs. paper, leather, oilcloth. Pop. 7200.

Skryabin, Alexander Nikolaievich, see SCRIABIN.

Skuas, or *Stereorarinæ*, sub-family of the Laridae, to which also belong the gulls, terns, and skimmers. They are entirely marine, and are very widely distributed, although their chief breeding grounds are on the E. of the N. Atlantic, from the coast of Labrador to the Shetlands, and on the E. of the Antarctic. Sev. of the species may also be found on Brit. coasts. In length they average about 20 in., with long, well-developed wings and short, stout legs, and in colour are greyish above, white below; in character they are fierce, and will attack smaller birds to make them disgorge the fish they have captured. There are seven species. *Megalestria calarrhætes*, the great S., and *Stercorarius parasiticus*, Buffon's S., are well-known species.

Skull (*cephalus*) is, from the evolutionary point of view, a development from four vertebrae, but its parts may best be considered separately. It consists essentially of the cranium, or brain case, the two olfactory capsules, the two auditory capsules, and the jaws; the last represent the first visceral (i.e. mandibular) arch. There are twenty-two bones in all. The cranium is a strong case or box for the protection of the nerve centres of the highest functions of vertebrate animals, and its form and size are of the highest interest to biologists, not only comparatively between the animals, but between different races of men existing now as well as those of the past. Among fossils the Engls and Neanderthal S., dealt with by Huxley, and the more recent Piltdown, Peking, Java, and South African S., have led to much controversy. For this aspect of the question see T. Huxley, *Man's Place in Nature*, and *Other Essays* (1863: Everyman's Library); also the articles on ANTHROPOLOGY and MAN. The bones of the S. are mainly formed during fetal life, but they do not immediately close together; a large amount of play facilitates delivery, and renders the S. adaptable to the varying size of the brain during early life. The two 'fontanelles' of the mesial line do not close normally for two years after birth; the pulsations of the blood vessels supplying the brain are visible through these, as also through two lateral

fontanelles. The serrated edges of the bones approach, interlock, and grow together, forming the *sutures*, a process lasting very variously into adult life; meanwhile the bones thicken, assuming finally a form with their inner and outer surfaces, hard and glossy, with an interior *diploe* full of channels and small cavities, adding enormously to the strength. The base of the S. is composed of very thin bone, more easily fractured. The sinuses of the S. are air spaces communicating with the nose. They lighten the S., and give resonance to the voice. Infection of the sinuses may take place from the nasal cavity. The full-grown S. is classified anthropologically into the *dolichocephalic* (long), *mesocephalic* (medium), and *brachycephalic* (broad) types, corresponding to Negro, Samoyed, and European respectively. The capacity of the S., measured by the volume of water sand, or other fluid it will contain, averages 85 cubic in. (1400 c.c.), but varies from 61 to 110. The *cephalic index* is found by multiplying the breadth by 100 and dividing by the length. The projection of the jaws accompanies variation of S. shape, giving rise to a classification, as *prognathous* (Australian), *mesognathous* (African), and *orthognathous* (European) varieties. S. capacity is of importance to anthropologists, since it is regarded as an index of mental capacity, which would, however, seem rather to follow the development of convoluted brain surface. The deformed S. sometimes found in children, the *hydrocephalic* and the *microcephalic*, are due to congenital disease, and are usually accompanied by some form of mental deficiency; the former is abnormally large, the latter small. See A. A. Russell-Green, *An X-ray Atlas of the Skull*, 1918; F. G. Parsons, *Anglo-Saxon Skull Contours*, 1928; and G. R. de Beer, *The Development of the Vertebrate Skull*, 1937. (See also bibliography under BRAIN.)

Skunk (*Mephitis*), Amer. genus of carnivorous mammals with remarkably developed anal glands from which, when provoked, they eject a fetid secretion. The common S. (*M. mephitis*) is about 2 ft. long, including the tail, and black or dark brown in colour with white markings on the head and back. Its head is small, long, and conical, and the ears short and rounded; the legs are short and partly plantigrade, the animal burrowing in the earth. Its food consists largely of small rodents and insects, but fruit and the eggs of poultry are often stolen. It is daring and fierce, and can inflict a nasty wound with its teeth, but its intolerable secretion is more feared. Its furry skin is purified and largely used by furriers.

Skutari, see SCUTARI.

Skutari Lake, see SCUTARI LAKE.

Sky, see ATMOSPHERE; CLOUD; DUST; HAZE; METEOROLOGY; VISIBILITY.

Skye, largest is. of the Inner Hebrides, Inverness-shire, Scotland, separated from the mainland by the sound of Sleat (20 m. by 7). It is very much indented, and is famous for its cliff and mt. scenery, of which the most impressive is the Black

Cuillin ridge. From the shores of Loch Coruisk its dark precipices rise to a height of 3000 ft. at some points, and it offers excellent rock-climbing. S. has a mountainous surface watered by numerous rivers, which abound in salmon and trout, the fisheries of S. being of some importance. There is little arable land, but oats, potatoes, and turnips are grown, and sheep and black cattle bred. Portree, the cap., has a factory for tweeds, plaids, etc. Area 670 sq. m. Pop. 8600. See Royal Commission on Ancient Monuments Report.

Skye Terrier, bred in the Isle of Skye as a vermin dog, and even after years of petting as a lap-dog and muffling in long hair, it is a courageous animal, keen for sport, while it is a good-tempered and intelligent dog and an excellent guard. The modern type has a long head with a powerful jaw. The skull is wide at the front of the brow, narrow between the ears, and tapering towards the muzzle.



SKYE TERRIER

The eyes are dark and rather close, and the nose is black. The body is long and low, the shoulders broad, chest deep, legs short, straight, and muscular, and feet small. The coat is long and straight, with a soft woolly undercoat, the colours dark or light blue or grey or fawn with black points. There are two varieties: the prick-eared, in which the ears are erect, and the drop-eared, in which they hang down at the side of the head.

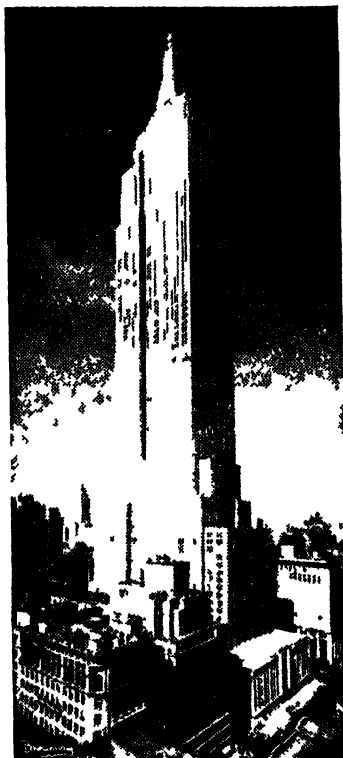
Skylark, see LARK.

Skyro, or **Skyros**, is. in Greece, one of the Sporades group, 24 m. N.E. of Euboea. It has an area of about 80 sq. m., and is 17 m. in length. The surface is mountainous, and sheep and goats are reared. Pop. 3500.

Skyscraper, many-storeyed building found most frequently in the U.S.A., the highest being the Empire State Building (1250 ft.), which has 102 storeys. S. are built on a skeleton steel framework, and were first constructed at the end of the nineteenth century, in the U.S.A. The main disadvantages of the S. are the exclusion of light and air from the streets below. See also ARCHITECTURE, *Modern American Architecture*, Sla, see SALLEE.

Slade, Felix (1790-1868), Eng. art collector, b. in Lambeth. He bequeathed his collections of engravings, glass, and

pottery to the Brit. Museum on his death S. was also a noted book-collector, and left £35,000 for the endowment of art (Slade) professorships at Oxford, Cambridge, and Univ College, London (in Gower Street), the Slade School being called after him.



Empire State Incorporated

THE EMPIRE STATE BUILDING,
NEW YORK

Slag, mixture of silicate chiefly of lime and alumina produced in many metallurgical operations. Blast furnace S. is chiefly calcium and aluminium silicate and varies in character from a glass to a stony type. Some 20,000,000 tons of blast furnace S. are produced annually. Some kinds of S. are made into bricks and paving stones. Cement is made from S. containing much lime, while the phosphoric S. from the basic steel process and from the Cleveland iron is used as a manure. S. wool which is sound and heat proof, and used for covering boilers and steam pipes, etc., is prepared by blowing steam through molten S.

Slathwaite, mrkt. tn. in the W. Riding of Yorkshire, England, 4 m. W S W. of Huddersfield, on the R. Colne. The chief manufs. are woollen goods. Pop 5000

Slalom, see under Ski

Slang, colloquial phraseology generally but specially used of the colloquialisms of the uneducated persons of a particular vocation, or thieves and other criminals. Some 17 philologists assign the origin of the *argot* to the associations of Parisian vagabonds in the fourteenth or fifteenth century. Ling S. or cant language, as it is also termed, lacks the precision and depth of *argot*, or the astonishing fertility and inventiveness of Americanisms (*g n*). Professional S. generally goes little further than to designate by a very obvious vocabulary things in common use among the class or the usages of the profession. Sporting S. probably possesses the cleanest cut colloquial vocabulary, a fact which may be explained by the tremendous vogue of sport generally in England and the opportunities it gave to the sporting journalist. The *flash* or cant language of the thief and itinerant beggar, on the other hand, is more glib, being the key to which is for the most part in the possession of the police. Increased in times the vocabulary of Ling S. has been increased by words of Anglo-Saxon and Saxon origin, by Latin from Latin English, and by Americanisms. During the two world wars new slang, especially in the United States, was coined by both combatants for service and civilian military language, much of which taken from the *argot* of the United States is called *slang*. The compound term denoting 'stringer language'. Thieves call it *lolan* (meaning 'clever language'). It is a jargon of High (i.e. colloquial) word and twisted phrases borrowed from Hebrew.

Cant, a world now remarkably changed in meaning, was once the street vocabulary of the vagabond men of the seventeenth and eighteenth centuries. Owing chiefly to the arrival of the gypsies in England the criminal classes had become not only much more numerous but more participatory, and in consequence had evolved language of their own, commonly known as Cant or Pelter. Little known in the evolution of the nineteenth century S. Prof. Ernest Weekley says: 'This thieves' patter was assimilated by the less formal part of the community with the social avidity with which their descendants acquire the American jargon of the cinema. Combined with the colloquial speech of the cockney, the crude elements of rustic dialect, and the special lingo of the soldier, the sailor, and the polyglot adventurer, the day it produced the eighteenth century S. Examples of this old kind of S. are: 'dance the Paddington fish' meaning to be hanged (at Tyburn), 'He has had air and exercise' meant he had been flogged, 'a tho' cart's fall' meaning 'Giles', 'meant a lame man, St. Giles being the patron saint of cripples, and 'frosty face' was one marked with smallpox. S. words frequently pass into standard Ling S.

'queer' and 'rum'—formerly contrasted and now almost synonymous. See J. S. Farmer and W. E. Henley, *Dictionary of Slang and Colloquial English*, 1905; E. K. Partridge, *Words, Words, Words*, 1933, *A Dictionary of Forces Slang, 1939-45*, 1948, and *A Dictionary of the Underworld*, 1950.

Slater, see **WOODLOUSE**.

Slates, typical cleaved and fine-grained argillaceous rocks which have been metamorphosed by intense pressure. Many S. result from the action of pressure on volcanic ashes. They are generally blue-black, purplish, or greenish in colour, are fissile and split into thin sheets or laminae, which are independent of the bedding planes (see **CLEAVAGE**). The anct. Palaeozoic rocks yield the bulk of slate rocks. Slate quarries occur on the N. coast of Cornwall; various parts of Cumberland, the W. coast of Scotland, and in Ireland and Wales. The nature and number of the natural joints which intersect the slate bed or 'vein' affect its value. If they are rare more expense is incurred in severing the blocks from the bed; if they are numerous, the bed may yield blocks too small for making the larger and higher priced sizes of S. The Welsh S. are probably the best, and are renowned for their thinness, straightness, and lightness, but the Irish and the Lake District varieties are tougher, harder, and more durable; while for solidity and strength the Scotch are perhaps superior to either, but they sometimes contain iron pyrites. S. are very resistant to atmospheric agencies, and are therefore chiefly used for roofing work. For this purpose they are trimmed to definite sizes which are known as 'princesses', 'duchesses', 'countesses', and 'ladies'. The dimensions range from 24 in. by 14 in. to 9 in. by 6 in., and the S. are sold by the thousand. Large slate slabs may be planed by machines, and used for dairy fittings, tables, cisterns, and for writings. When polished, painted, and enamelled, S. may be used for mantelpieces as an imitation marble. At the quarries the slate blocks are severed from the natural bed by wire-saws or other power cutters. The blocks are split into slabs, which are then sawn into shape and planed smooth by machinery. By the dexterous use of wedges or wooden mallets, the slabs are split into thin sheets, which are trimmed into rectangular sheets of the required dimensions. This operation is often performed by hand, but usually special knives, worked by machinery, are employed. The S. are then sorted by hand according to their quality. Slate pencils are made from powdered S., which is moistened and subjected to pressure. They may also be cut from soft slate. Debris of the quarries are used for this purpose, and for making into bricks.

Slatoust, see **ZLATOUST**.

Slaughter-houses, premises licensed by the local authority and Ministry of Health for the slaughter of animals for human consumption. The term *abattoir*, of Fr. origin, means a public slaughter-house. By the Public Health Act, 1875, councils of both municipal boroughs and urban dist.

councils had power (subject to existing privileges of any company or other persons incorporated by any local Act for making and maintaining S. passed before Aug. 31, 1848) to provide S. and knacker's yards; but rural dist. councils had first to obtain the authorisation of the Local Gov. Board. Private S. or knackers' yards which existed before 1848 required only to be registered with the local council; but all other private S. or yards required an ann. licence, and had to be managed in accordance with the by-laws of the local authority. Such by-laws, were subject to confirmation by the Ministry of Health. Since 1940 the S. have been concentrated and are under the control of the Ministry of Food. The slaughter-house in 1950 was of entirely different construction than that existing in 1939, being good airy buildings, tiled or glazed walls, good drainage disposal and self contained units, under the supervision of the local authority. Under existing laws animals must be rendered unconscious and then slaughtered by use of cash captive bolt gun or electro-thalers (an exception is made for the Jewish and Moslem method), the carcasses being inspected by qualified inspectors employed by the local authority before the meat is allowed to be distributed to the consumer. Unfit carcasses are destroyed on the premises and rendered down for technical greases and fertilisers. Modern slaughtering practice has a number of highly skilled operations and sev. by-products, i.e. sausages, canned meats etc., intestines, the sausage casings and surgical gut, glands for medicinal purposes, edible fats, technical greases, glue, animal feeding meals, fertilisers, hides and skins, hair for brushes and sev. other uses.

More animals are killed for food in the U.S.A. than in any other country in the world. Former abuses existing in U.S.A. S. have been eliminated by Federal and state laws, and existing conditions are humane, and hygienic. Extremely modern equipment and methods are used. The biggest S. in the world are at Chicago.

Slave Coast, part of the coast of Guinea, W. Africa, lying between the Gold Coast and the R. Benue, and now comprising Nigeria and Dahomey.

Slavery and Slave Trade, Slavery is properly the condition of a human being who is the property of another, though such condition may vary from the extreme 'rightness' of the Roman *servus*, whose labour could be exploited and his life taken by his master with impunity, to the mitigated rigour of the *ascripti glebae*, or serfs of the soil of the later empire and the Middle Ages, who, though they passed with the soil and were bound to remain on it, had much of the position of freemen. Again, it may be a status to which a man was born or a condition thrust upon him by debt, capture in war, or his own crimes; or, as in America or the Congo dist., it may be rather the condition of having to perform compulsory labour at the will of a conquering European race. In Rome the sentiments against slavery, inspired by the Christian teaching or expressed in language borrowed from the

Stoic philosophy, were productive rather of penalties for ill-treatment of slaves than of any tendency to abolish the status itself. The Gks. of the pre-Stoic period were so habituated to slavery that their philosophers never made any objection to it, and seemed rather to suppose that the institution was founded on permanent diversities in the races of mankind. Slavery appears to have been from the earliest ages the *natural* or *normal* condition of a large proportion of mankind in almost every country until times comparatively recent, when it has been gradually abolished by all Christian states in Europe. It existed among the Jews, and continued to exist till late in the nineteenth century in many parts of Asia. The practice among all anc. nations was to reduce to slavery any prisoners of war that were not killed. Another anc. source of slavery was kidnapping, especially among maritime states like the Phœnicians, Cretans, and Cilicians; and Herodotus states that some of the Thracian tribes sold their children to foreign dealers. Among the Gks. slavery existed from the heroic times. Agric. labour was in some instances performed by poor freemen for hire, but in most places, especially in the Grec states, by a class of bondmen, the descendants of the older inhab., who lived upon and cultivated the lands appropriated by the conquering Attic race. Sometimes these bondmen paid rent, and it is not improbable that everywhere in Europe the evolution of the land-serf into the free agric. tenant followed much the same lines. Athens, Corinth, and other commercial states had a large number of purchased slaves, mostly natives of barbarous countries. In Attica there were private slaves belonging to families, and public slaves belonging to the state, who were employed in the fleet and in the construction of public buildings and roads. The number of slaves, domestic and rustic, possessed by the wealthy Romans was enormous; some individuals are said to have possessed 10,000. The Rom. slave had no rights whatever, and was regarded as a mere chattel; he could acquire no property, and all the produce of his labour accrued to his master; he could not contract a Rom. marriage and union with a person of his own rank was styled 'cointubernium', and even the Christian Church for centuries did not acknowledge slave marriages. Public slaves in Rome were those which belonged to the state or to public bodies, such as municipia and collegia, or to the emperor in his sovereign capacity; some were employed in public duties of a highly honourable nature, e.g. as keepers of public buildings, prisons, or other state property, while those of an inferior type were employed as road repairers, watchmen, liotors, and scavengers. Private slaves were either urb. or rustic according to whether they served in tn. or on country estates. The *serri terræ* of the later period of the empire reveal strong points of resemblance to the serfs and villeins of the Middle Ages, but there appears to be

no evidence of any historical connection between the *coloni*, *rustici*, or *ascripti glebæ*, on the one hand, and the *villani* of the feudal system, on the other (see on this F. K. von Savigny, *Über den römischen Colonial* (minor works), and Sir P. Vinogradoff, *Villeinage in England*, 1927).

The Eng. *villain* or depressed coolie must not be confused with the bondman or serf. The Eng. serfs (*thralls*, *thengs*, or *slaves*) were either *hereditary slaves*, i.e. descendants of the old Britons, or *vile theows*, persons reduced to servitude for crime, neglect to pay a fine, or voluntary sale (Stubbs). They soon disappeared as a class after the Conquest. The villani were the cultivators of the land; each had a house and a certain quantity of arable land lying in scattered strips in the common fields of the vill, and there were many ways by which a villan could buy his freedom, e.g. by residing in a tn. as a burghage tenant for a year and a day. In many respects the position of a villan was not without its compensations, and compared not unfavourably with that of the 'wage-slave' brought into existence by the Industrial Revolution. When the traffic in slaves ceased among the Christian nations of Europe, it continued to be carried on in the age of the crusades by the Venetians, who supplied the markets of the Saracens with slaves purchased from the Slavonian tribes along the Adriatic. Christian captives taken by Muslims were sold in Asiatic and N. African markets, and continued to be sold till the beginning of the nineteenth century, when the interference of the Christian powers, the conquest of Algiers by France, and the emancipation of Greece resulted in the abolition of the practice in Barbary, Egypt, and the Ottoman Empire.

With the discovery of America, a new description of S. and S. T. arose. Christian nations purchased African Negroes for the purpose of employment in mines and plantations of the New World in substitution for the native Indians who were too weak to undergo the work extorted by their Sp. taskmasters. Again, the Portuguese, who were early possessed of a great part of the coast of Africa, obtained by force or barter a considerable number of slaves; and the demand for slaves by the Portuguese in the Atlantic harbours soon induced the native chiefs to make predatory incursions into each other's territory, to make captives for the European market. In the Brit. colonies in the latter part of the eighteenth and the beginning of the nineteenth century much was done by Parliament. Courts were estab. to hear the complaints of the slaves, flogging of females was forbidden, and the condition generally of the slave pop. was greatly ameliorated. Thomas Clarkson and the Quakers prepared the ground for Wm. Wilberforce (q.v.), who brought the subject before Parliament in 1788. Owing to the inoperative nature of the slave trade opened up by the conquest of Dutch colonies, the traffic was not abolished by Parliament until 1807. In 1811 Brougham carried a Bill for making slave trading a

felony, punishable by transportation or hard labour, and in 1824 the slave trade laws were consolidated by an Act which declared the slave trade to be piracy and capitally punishable. The consequence of agitation by Great Britain after the Napoleonic wars was that long before the middle of the nineteenth century most of the European and Amer. powers had passed similar laws, or entered into treaties for the prohibition of the traffic. For long, however, a considerable internal slave trade continued to flourish in the U.S. of N. America; and Negroes continued to be bred and sold in Maryland and Virginia, and some other of the slave-holding states, and carried to the more fertile lands of Alabama, Louisiana, and other southern states. The slavery question was a predominant cause of the Amer. civil war of 1861-65. The victory of the Union over the Southern Confederate States ended slavery for ever in the U.S.A. Until recent times a mitigated condition of serfdom existed in Russia and Poland, and even in India.

See T. F. Buxton, *African Slave Trade* (2nd ed.), 1838, and *The Remedy*, 1840; W. H. Smith, *Political History of Slavery*, 1903; *The Social and Humanitarian Activities of the League of Nations*, 1926; G. F. Dow, *Slave Ships and Slavery* (Salem), 1927; C. Lloyd, *The Navy and the Slave Trade*, 1949.

Slavonia, see CROATIA-SLAVONIA.

Slavonski Brod, tn. of the Peoples' Republic of Croatia, Yugoslavia, on the l. b. of the Sava R. It is an important railway centre and has engineering works. The twin tn., Bosanski Brod, is on the r. b. Pop. 15,176.

Slavs, or **Slavonians** (native name *Slavene* or *Slavane*, derived by some from *Slawa*, fame, but better from *Slava*, a word, thus meaning 'speaking' or 'articulate,' as distinguished from other nations, whom they called *Nemetz*, or 'Mutes'), general name of a group of nations belonging to the Aryan family, whose settlements extend from the Elbe to Kamchatka, and from the Arctic Sea to Ragusa on the Adriatic, the whole of E. Europe being almost exclusively occupied by them. They were settled in these regions before the dawn of hist., and are comprehended by anct. writers under the designations of Sarmatians and Scythians. The original names of the Slavic tribes seem to have been Winds or Wends (*Venedi*) and Serbs. The earliest historical notices extant represent the S. as having their chief settlements about the Carpathians, from which they spread northward to the Baltic, westward as far as the Elbe and the Saal, and later, after the overthrow of the kingdom of the Huns, southward beyond the Danube and over the whole peninsula between the Adriatic and the Black Sea. These migrations ceased in the seventh century; the div. of the Slavic stock into separate branches became now more complete, and gradually they began to form into independent states.

The various sections of the stock may be divided into two groups, the S.E. and the W. The first comprehends (1) Russians,

(2) Bulgarians, (3) Illyrians (Serbs, Croats, Winds); the second (1) Lechs (Poles, Silesians, Pomeranians), (2) Czechs or Bohemians (Czechs, Moravians, Slovaks), (3) Polabians, comprising the Slavic tribes of N. Germany, who are fast disappearing by absorption in the Teutonic pop. The whole of the Slavic pops. is estimated at upwards of 210,000,000, made up of about 148,000,000 Russian Slavs, 10,000,000 Czechoslovaks, 20,000,000 Yugoslavs, 20,000,000 Poles, and 8,000,000 Amers.; but this estimate is, in the nature of things, somewhat arbitrary because certain other races, such as the Magyars and the Gers. of Austria, have much Slav blood, and, moreover, occupy soil which was formerly Slavonic, and again, in S. Hungary, there is much intermingling of races, while it is not easy to draw clear distinctions between those Asiatic Russians in Siberia who are and those who are not S., though, generally speaking, the S. are supposed to be all those who occupy the cultivable land south of about 50° N. lat. as far E. as the Pacific.

The S. are represented by anct. writers as an industrious race, living by agriculture and the rearing of flocks and herds, as hospitable and peaceful, and making war only in defence. The feeling of nationality was strong among them. The gov. had a patriarchal basis, and chiefs or princes were chosen by assemblies. Their religion seems to have been a kind of nature-worship. The chief deity was Swatowit, with whom were associated, on a nearer footing of equality than the other gods, Perun and Radegast. In this trinity Swatowit is considered as most analogous to Mars and Zeus, Perun to Jupiter and Thor, and Radegast to Mercury and Odin. Christianity was introduced among the eastern S. in the ninth century by Cyril and Methodius. For Slavonic languages see under INDO-EUROPEAN LANGUAGES. See R. N. Bain, *Slavonic Europe*, 1908; E. J. Kerker, *Bibliography of Slavic Europe*, 1918; J. B. Bury, *Earlier History of Slavic Settlements in Dalmatia, Croatia, and Serbia*, 1920; H. H. Arnold, *Chronicles on the Slavs*, 1935; and A. Mousset, *The Slavonic World*, 1949.

Slavyansk, or **Slaviansk**, tn. in the Ukrainian S.S.R., in the Donetz valley, 110 m. S.E. of Kharkov. There are a number of salt lakes in the vicinity, and S. is noted for its salt works and saline baths. Pop. 75,500.

Sleaford, mkt. tn. of Lincolnshire, England, 18 m. S. of Lincoln. It is the centre of the administrative area of Kesteven. S. stands on the R. Slea which rises at Ancaster and divides into two separate streams on reaching the tn. Notable features include the par. church, a fine medieval building dating from the thirteenth century, and its half-timbered vicarage; Carre's Hospital (a group of almshouses) founded in 1636; and Carre's Grammar School founded in 1604. Pop. 7600.

Sled, or **Sledge**, see STERAN.

Sledmere, vill. of the E. Riding of Yorkshire, England, 8 m. from Driffield. S.

Park, for long the seat of the Sykes family, is famous for its stud of horses estab. by Sir Mark Masterman Sykes in 1804.

Sleep, periodic state of more or less complete unconsciousness, during which voluntary activity ceases. It constitutes a period of rest or inactivity during which anabolic processes are in excess of katabolic, i.e. a period of recuperation. While fatigue and the diminution of afferent nervous stimuli are recognised as conditions conducive to S., many hypotheses have been advanced to explain its nature and causation. Some of these are: (1) *Accumulation of Acid Waste Products*. It has been suggested that the accumulation in the blood of acid waste products of the functional activity of the muscles and nervous system during waking hours, results in a gradually increasing loss of irritability in the brain cells. This insensitivity to stimuli finally produces a depression of their activity sufficient to cause unconsciousness. The accumulation is not normally carried to the extent of producing involuntary sleep, for when the sensation of drowsiness or sleepiness becomes apparent, our habit of inducing sleep by withdrawing ourselves from all sources of mental and physical excitation comes into operation. (2) *Consumption of Intramolecular Oxygen*. This theory is based on the suggestion that during waking hours the brain cells use up their store of oxygen faster than it can be replaced by absorption of oxygen from the blood and that this oxygen starvation results in a gradually progressive diminution in cellular irritability, so that when their functional activity is still further reduced by the withdrawal or prevention of external stimuli, the oxidation processes in the cells sink below the level necessary to maintain consciousness. During S. this store of intramolecular oxygen is once more replenished. (3) *The Nerve Theory*. Afferent impulses reach the cortical cells through the contact of the terminal arborisations of afferent nerve fibres with the dendritic processes of the cells. This theory is based on the assumption that these latter processes are contractile, and that their retraction mechanically produces S. by constituting a break in the path of the afferent impulses, which isolates the cortical cells from external stimuli. Such dendritic retraction has, however, never been histologically demonstrated. (4) *Anæmia Theories of Sleep*. It has been suggested that the periodicity of S. is due to the rhythmical loss of tone in the vasomotor centre in the medulla, resulting from fatigue caused by continued activity during waking hours. The fatigued centre needs stronger and stronger stimulation to maintain its normal tone until eventually the effect of its action on blood pressure becomes insufficient to maintain an adequate flow of blood through the brain, and unconsciousness (i.e. S.) results. This fatigue of the vasomotor centre is ordinarily reinforced by our voluntary exclusion of external stimuli and it is possible that this exclusion, alone, may be all that is necessary to produce a

short period of S., by depressing the activity of the centre and thereby bringing about a lessened supply of blood to the brain. It is obvious, however, that the withdrawal of stimuli from an already fatigued centre will produce a more lasting period of S. The degree of fatigue in the cortical cells themselves, after a day's activity, must also be included as a factor favouring the production of S. It is probable, therefore, that sev. factors combine in the production of a state of S. of average duration, but the main factor that explains its rapid onset, the almost simultaneous involvement of all the conscious areas of the brain, irrespective of their state of fatigue, and the sudden return to consciousness of the whole cortex, is the amount of the blood flow to the brain.

Sleeping Sickness, or Negro Lethargy (Trypanosomiasis), is mainly confined to natives of Africa, but a number of whites have also been attacked by the disease in N. Nigeria. It is definitely local, and was originally noted in W. Africa, though it has appeared in other parts since, notably Uganda. The commencement of the disease is insidious, and is accompanied by gradually increasing lethargy and dullness. There are no other marked symptoms, but the patient gradually sleeps more and more; stupor at last ensues, and the patient dies. The tsetse fly (*G. f.*) conveys infection by transmitting the trypanosome (parasitic flagellate) responsible for the disease. The disease may terminate fatally within a month or two, or last for sev. years. S. S. is sporadic in W. Africa, but its transmitter, the tsetse fly, though prevalent throughout a great part of Brit. W. Africa, is rarely so numerous or so voracious as it is in many parts of E. Africa. There have, however, been sev. serious outbreaks of S. S. Occasional cases still occur in the Gambia, which gave its name to the first form of human trypanosome identified by science. In Tanganyika Terr. in the years 1927-35 the number of deaths ranged from 170 to 580 and occurred chiefly in the Tabora prov. The relief enforced in the terr. for some years has been to remove natives from infected districts, and to concentrate them in fly-free areas outside the forest or in extensive clearings. This policy has given good results in conjunction with treatment with Bayer's '205' (Suramin) and Tryparsamide a new drug. Anticidal is now being used. But the only area where the disease is a serious menace to the natives is in the Tabora prov., and there the work of the S. S. dept. has resulted in a much reduced incidence. The Tropical Research Committee of the Medical Research Council has been responsible for investigation into S. S. among other tropical diseases, and financial support has been forthcoming from the Colonial Development Fund. The research station for the investigation of *Trypanosoma rhodesiense* was completed in 1931. See W. Byam and R. G. Archibald (ed.), *Practice of Medicine in the Tropics*, 1922; Manson's *Tropical Diseases* (12th ed.), 1945; also reports of

the League of Nations Commission on Human Trypanosomiasis.

Sleeplessness. Loss of sleep is more injurious than starvation. In man it causes decrease in weight, the body temp. falls, muscular and nervous reactions diminish in intensity, but there is an increase in acuteness of vision. A small amount of extra sleep soon causes complete restoration to the normal state. S. may be caused by the nervous state of the brain or by factors affecting the body as a whole. Extremes of hunger, thirst, temp., and pain are sometimes responsible. If the mind is overactive, excited, or emotionally upset, sleep may be difficult, though the body is tired. Fear of injury or 'nightmares' in the case of children hinders sleep. Sleep can be induced by the administration of sedative drugs, often done in the case of S. through pain; the barbiturates have partly replaced chloral and potassium bromide in the treatment of S. Morphine remains the most effective drug for relieving S. caused by pain.

Sleep-walking, see SOMNAMBULISM.

Sleepy Hollow, valley near Tarrytown, New York, U.S.A., commemorated in *The Legend of Sleepy Hollow*, by Washington Irving.

Sleepy Sickness, see ENCEPHALITIS LETHARGICA.

Sleet, see under SNOW.

Sleeve-valve, see under VALVES MECHANICAL.

Sleigh, Sledge, or Sled, vehicle fitted with runners, for use on snow and ice, drawn by horses, dogs, reindeer, etc., according to the country and kind of vehicle. Strictly speaking, the lighter and more graceful form of driving and travelling is a S., whilst the heavier form, used for transport, etc., is a sledge. Russia and Canada are two countries where the use of the S. is widespread. The *luge* is a high type of wooden sledge found in Switzerland and elsewhere. It is ridden down hard slopes facing forward and astride, stopping and braking taking place by inserting the heels in the ground. See also TOBOGGANING.

Slessor, Sir Henry (b. 1883), Brit. judge, b. in London and educated at Oundle, St. Paul's, and London Univ. He became a barrister in 1906, specialising in trade union law. He took silk in 1924, and was made solicitor-general of the first Labour gov. in the same year. From 1929 to 1940 S. was a lord justice of appeal. A J.P. himself, he advocated a professional magistracy. S. was a leading Anglo-Catholic until his conversion to Roman Catholicism, and was a vice-president of the Church Union. He was also a keen student of hist. His pub. include *Trade Union Law* (1922); *Religio Lawi* (1929); and *History of the Liberal Party* (1944).

Slessor, Mary Mitchell (1848-1915), Scottish missionary, b. in Aberdeen. See further under CALABAR.

Slide Rule. If two rulers be accurately graduated and slide one on the other, the processes of arithmetical addition and subtraction may be performed mechanically; if the zero on one ruler be placed

coincident with 6 on the other, the sum of 6 and any other number will appear on the fixed ruler below the other number on the sliding scale. If, however, the scales be graduated, not in the natural numbers, but in their logarithms, numbered as natural, a similar movement will give the product (see LOGARITHMS). By arranging a number, say 2, on the sliding scale coincident with 6 on the fixed scale, the quotient of the process of div. appears on the fixed scale under the zero of the slide. By a series of movements it is clear that any fraction, *abc...pqqr...* may be evaluated. Powers and roots may also be determined. There are usually four scales, the graduations on two being half those on the other two, but exponential scales are sometimes added, and special S. Rs. are prepared for particular calculations. The cursor is a frame, with a hair line ruled in glass or celluloid, for placing over any intermediate product or quotient. The common form of S. R. is 10 in. long, and by tuning over the slide, which has logarithmic lines and tangents on the reverse as well as a simple log-scale, the range of calculations is increased. The same principle is in use with many other types of instrument, the sliding being variously accomplished. The Saxonie anthonmetre will give products to twelve figures; Thacker's S. R. is a cylinder sliding in fixed scales; Prof. Fuller's instrument, 12 in. long, 3 in. diameter, is spirally arranged, and equal to a straight rule 83 ft. long, correspondingly increasing its range. The Stanley-Bonches calculator is in the form of an ordinary watch. The principle of S. Rs. was introduced by Prof. Gunter, of Gresham College, London in 1620; Wingate in 1626 improved the instrument by using a slide, the earlier form requiring dividers for computing. For concise and simple rules for use, see Boncharit and Perrot, *New Trigonometry for Schools*, appendix n., 1901, and the instructions supplied by manufacturers of S. Rs.

Sliding Scale, see under CORN LAWS.

Slieve Donard, mt in CO. DOWN, N. Ireland. It is 2796 ft. high, being the highest peak of the Mourne Mts.

Sligo: 1. Maritime co., in the prov. of Connaught, Ireland, bounded N. by the Atlantic, S.W. and W. by Mayo, E. by Leitrim, and S.E. by Roscommon. The bays of Killala and Sligo indent the shore, while the surface near the sea is flat and boggy, the interior being hilly. The highest point is Trillickmore (2112 ft.) in the E. boundary. The rivers are unimportant, but Lough Gill, Arrow, Esky, Talt, and Gara are picturesque. Fishing and agriculture are the most important industries. There is some mineral wealth, including coal, lead, and copper. W. B. Yeats wrote much of his poetry about S., where he lived for many years. Three members are sent to the Dail Area 710 sq. m. Pop. 82,300. 2. Municipal bor. and mkt. tn., seaport and co. tn. of co. S., Ireland, situated on the Garavogue R., between Lough Gill and the sea. It is one of the chief W. ports of Ireland, the exports being grain, flour, pork, and cattle; the

imports, coal, iron, timber, and provisions. It possesses a fine ruin of the Dominican abbey founded by Maurice Fitzgerald, lord justice in 1252, and 3 m. away, at Carrowmore, is a remarkable collection of megalithic remains, while at Drumcliff, in the neighbourhood, there is a round tower with a Celtic cross 13 ft. high. Pop. 12,500.

Sligo Bay, opening, 12 m. long, on the Atlantic coast of Eire, co. Sligo.

Slim, Sir William Joseph (b. 1891), Brit. soldier, b. at Bristol. He became an elementary school teacher in Birmingham, joining the army on the outbreak of the First World War. He was commissioned, serving in Gallipoli and Mesopotamia. After the war he joined the Indian Army. S. commanded the First Burma Corps in 1942, and directed its fighting withdrawal to India. He returned to Burma to direct the 15th Indian Corps at Arakan, in Oct. 1943, and became commander of the Fourteenth Army (q.v.), whose operations during 1944 marked the turning point of the Burma campaign. He inspired the men under his command with renewed confidence, as well as showing himself a capable administrator and superb tactician. In Sept. 1945 S. was appointed commander of the allied land forces, S.E. Asia. Becoming commandant of the Imperial Defence College, he was appointed chairman of the railway executive in 1948, but relinquished this post on being appointed to the War Office as chief of the Imperial General Staff in succession to F.-M. Lord Montgomery. He was knighted in 1944, and became field marshal in Jan. 1949. See also BURMA, SECOND WORLD WAR CAMPAIGNS.

Slime-sel, see under BOKERS.

'Slim Piet', see JOUBERT, PETRUS JACOBUS.

Slipper Animalcule, see PARAMECIUM.

Slipper Coral, see CALCEOLA.

Sliven, Slivno, or Selimnia, tn. of E. Rumelia, Bulgaria, at the foot of the Balkans, 70 m. N.W. of Adrianople. It manufactures for the army and produces wine. Pop. 35,000.

Sloane, Sir Hans (1660-1753), Irish physician, b. at Killybegh, co. Down, and educated in Paris and Montpellier. He attended Queen Anne, and was created baronet in 1716. He was president of the Royal Society from 1727 to 1741, and held many other high positions. He founded the Botanical Gardens in 1721. He was a great collector of natural hist. specimens and books and MSS., and he left his collections to the nation. They are now in the Brit. Museum. S. in 1712 purchased the manor of Chelsea, and his ownership is indicated in Sloane Square, Sloane Street, Hans Crescent, and other roads. He wrote *The Natural History of Jamaica* (1707-25).

Slooom, Joshua (1844-1909), Canadian sailor, b. in Nova Scotia. By the time he was eighteen he had made sev. trips to the Far E. and was a second mate. In 1869 he became captain of a trading schooner carrying grain and coal between San Francisco and Seattle. A year later he sailed from San Francisco to Sydney in

command of the *Washington*, and from then onwards he went on sev. long voyages, and had many strange and dangerous adventures. In 1892 S. was offered the remains of the *Spray*, and on April 4, 1895, after completely rebuilding her, he sailed from Boston on his voyage round the world alone. He anchored at Newport three years later, having completed his voyage. In 1909 he set off from Bristol, Rhode Is., in the *Spray*, for the Orinoco R. and was never seen again. S. wrote *Voyage of the 'Libriade'* (1894) and *Sailing Alone Round the World* (1900) in which, with his racy style and vivid descriptions, he portrayed his two most extraordinary voyages, and gave a unique impression of the thoughts and acts of a nineteenth-century sailor and individualist of the Magellan and Drake school.

Sloop, see BLACKTHORN.

Sloop, small one-masted fore and aft rigged vessel, differing from a cutter in having a jib-stay and standing bowsprit. Name also applied from 1676 to relatively small warship carrying guns on upper deck only; then to a small corvette and, since the days of steam, to minor warships on trade defence duties. In June 1947 the term S. was abolished in the R.N. and all such vessels were called frigates.

Slopesburie, or Sloppesbury, see SHREWSBURY.

Slope Wall, name given to a wall, built of rubble or rough stone, which is erected on the side of a sloping earthen bank in order to prevent complete denudation of the latter by the action of the elements.

Sloth, name for various species of edentate mammals. Two genera, the *Bradypus* (three-toes) and the *Choloepus* (two-toed), are natives of S. Amer. forests, where they live almost entirely among the branches of the trees, feeding on leaves and young shoots. On the ground, to which they rarely descend, their movements are slow and awkward, hence their popular name. They are nocturnal in habit, hiding themselves during the day, their concealment being assisted in a remarkable manner by a covering of algae, which gives rise to a greenish tint on their coarse, shaggy hair. This camouflage is their defence, since they are harmless animals. The head is short and rounded, and the tail rudimentary. The forelimbs are powerful and much elongated; all the limbs terminate in three or fewer hook-like digits, facilitating movement along branches in an up-side-down position. The stomach is adapted to this position, and the trachea possesses a peculiar fold. Only one S. is produced at birth, and for some time it clings to its mother's hair with its arms round her neck while she moves.

Sloth Animalcules, see TARDIGRADA.

Sloth Bear (*Melursus*) is a large animal, with a shaggy coat and has a large white V on its chest. It feeds on white ants (termites), which it obtains by tearing their nest to pieces with its long claws. It devours the insects by scooping them up with a long tongue and protruding lower lip. The young are carried on the mother's back when she is moving. The

S. B. inhabits the wooded parts of India and Ceylon.

Slough, bor. of Buckinghamshire, England, 2 m. N.E. of Windsor. Formerly a small mkt. tn., it has grown, since the beginning of the twentieth century, into a large residential and industrial area, being granted a bor. charter in 1938. It was the scene of many of Sir Wm. Herschel's astronomical discoveries. During the First World War a gov. mechanical transport depot was estab. at S., which was afterwards converted into a trading estate of 700 ac., containing some 220 factories. Other factories in the tn. bring the total to approximately 300. There are large engineering and chemical plants. S. is also a centre of the boot and shoe industry and manufs. confectionery. Pop. 66,000.

Slough, mass of soft tissues which becomes detached after mortification. When a portion of tissue has become so far destroyed that the circulation is not adequately kept up in it, a layer of cells tends to be formed separating the healthy from the diseased flesh, and this ultimately leads to its detachment.

Slovakia, ter. of Czechoslovakia, peopled by the Slovaks (q.v.). Between 1919 and 1938 S. continually struggled against the centralisation of government at Prague, in Bohemia, and in 1938 secured autonomy following the reorganisation of Czechoslovakia after the pact of Munich. A virtual dictatorship of the People's party was formed on Nazi lines. On March 10, 1939, the Gers. fomented an uprising in Bratislava, the Slovak cap., and complete independence was declared under Father Tiso. After that S. was a mere 'puppet' state under Ger. 'protection.' It was occupied by Ger. troops and the Slovaks were forced to co-operate with Germany in the invasion of Poland. Slovaks abroad, however co-operated with the Czechs on the side of the Allies, and took part in the formation of a provisional Czechoslovak Gov. under President Beneš in London. The war possibly accentuated the differences between the two races while making them better able to realise their interdependence. Fear of Communism had the result of uniting Catholics and Protestants in S., and whereas the May (1946) elections returned the Communists as easily the largest party in the Czech provs., at least 70 per cent of the Slovaks voted anti-Communist. But, generally speaking, it may be assumed that ideological differences are far less likely than racial differences to preclude the chances of ultimate reconciliation. After the war S. was once more united with the Czech lands. This was, indeed, decided in 1944 by the exiled gov. of President Beneš and the leaders of the Slovak anti-Ger. rising of that year. Tiso, at that time, urged the people to help the Gers. to suppress the rising, and Slovak Fascist armed formations (the 'Hlinka Guard') obeyed these orders. After the war both the Czech and Slovak Communist parties insisted that Tiso, who had sent troops against the Soviet Union, should be executed. Yet among a great number

of Slovaks he remained popular; but among the Czechs, the National Socialists thought he was a traitor to the state and the Social Democrats followed the Communist lead. The Communists, both Czech and Slovak, would like to give S. approximately the status of a constituent republic of the Soviet Federation; but in practice the Communists, while urging full recognition of Slovak demands for autonomy, support centralisation. S. has an area of 18,902 sq. m. The cap. is Bratislava. Pop. 2,900,000. See further under CZECHOSLOVAKIA.



Czechoslovak Embassy

SLOVAKS

Slovaks, W. branch of the Slav race, inhabiting Slovakia, formerly part of Hungary. In 1918 the S. united with the Czechs of Bohemia, Moravia, and Silesia to form the republic of Czechoslovakia. Previous to this the S. were under Magyar domination. Till the eighteenth century the written language was a form of Czech, when it was supplanted by the Slovak dialect. The S. are a race of peasants, extremely independent, and frequently irritated by the Czech tendency to look upon them as inferiors, numbering some 2,900,000, and have occupied their present tor. since the fifth century. They are principally engaged in agric. pursuits and wood-cutting, are fond of music, and have their own folk-songs. The majority are Rom. Catholics.

Slovenes, branch of the South Slavs, inhabiting Styria, Carinthia, Gorizia, Carniola, and Istria. They were formerly under Hapsburg rule, but after the First World War they united with the Serbs

and Croats to form the state of Yugoslavia (*q.v.*). Like Serbian and Croat, Slovene is one of the South Slav group of Indo-European languages; it is an official language of Yugoslavia and is written exclusively in Lat. characters. The S. possess some literary reputation, the poets France Preseren and Valoutine Vodnik being the best known of their writers. The vast majority of S. are Rom. Catholic; they number over a million.

Slovenia, federative unit of Yugoslavia, populated largely by Slovenes (*q.v.*). S. is strategically important because of its position on the road from Austria to Trieste. The prin. riv. is the Save. Ljubljana (Ger. Laibach) is the cap.; other important tns. are Maribor and Celje. It has an area of 76,229 sq. in. Pop. 1,389,000.

Slowacki, Juliusz (1809-49), Polish poet, b. at Krzemieniec and educated at Vilna Univ. In 1839 he obtained a gov. post at Warsaw. He travelled extensively in Italy, Greece, and the E. S. is one of Poland's chief poets, his lyrical poetry being particularly fine. See K. Krakowski, *Trois destinées tragiques*, 1931.

Slow Match, loosely twisted hempen cord steeped in a solution of saltpetre and lime water, which burns at the rate of one yard in three hours. The S. M. was originally used for firing large guns and for blasting purposes.

Slow-motion Films, see under CINEMA-TOGRAPHY, *Films as an Aid to Scientific Research*.

Slow-worm, see BLIND-WORM.

Slubice, tn. of Poland, on the r. b. of the Oder. Before the Second World War it was part of Frankfort-on-Oder, which then stood on both banks of the riv. S. contains most of the industries of the original tn. Pop. 34,000. See FRANKFORT-ON-ODER.

Sludge, see under SEWAGE, Sewerage.

Slug, name for a number of naked or semi-naked air-breathing gastropod molluscs. Those belonging to the family Limacidae are without external shells, though most of them possess a small internal shelly plate or a few calcareous granules under the skin of the back. Like snails, they have a mouth composed of external fleshy lips and, within, a ribbon-like mass of teeth. They move by means of a flattened muscular part of the body called the foot. Male and female sexual organs exist in the same individual, and numerous eggs are laid in decaying vegetation. The commonest and most mischievous Brit. S. is the grey field S. (*Limax agrestis*). Other species include the bulb- or root-eating S., the black S., and the yellow or household S. Another group of S. (Testacella), which have the small shell external, hunt and destroy earthworms and insects, and are almost as beneficial as the others are injurious to cultivated crops.

Sluicing, see under MINING.

Sluis, or Sluys, tn. of Zeeland, Holland, 9½ m. N.E. of Bruges, with which it is connected by canal. It was the scene of a battle in 1340, when a Fr. fleet was destroyed by Edward III. Pop. 3000.

Slums and Slum-Clearance, see under HOUSING.

Slupsk (Ger. Stolp), tn. of Pomorze, Poland, formerly in Germany, 68 m. N.W. of Gdańsk (Danzig), in the R. Stolpe. It has a number of notable medieval buildings. Paper, machinery, textiles, and leather are made.

Slur, arching stroke in musical notation drawn over a group of notes and indicating that they are to be played *legato*. It may also be used between single notes of the same pitch or pairs of such notes in chords to prevent their being struck a second time; in that case, however, it is called a tie.

Slutsk, tn. in the Minsk region of the Byelorussian S.S.R. Pop. 16,600.

Smack, commonly a sailing vessel, although sometimes a steamship, used for fishing, with a hold amidships. The name is also used for a small-decked or half-decked vessel.

Smallholm Tower, tower in the co. of Roxburghshire, Scotland, 6 m. N.W. of Kelso, identified with Avenel Tower in Sir Walter Scott's *The Monastery*. Near it is Sandyknowe Farm, where Scott stayed for some time as a child.

Small Arms School. The S. A. S. is divided into two wings—one at Hythe (the former School of Musketry) and the other at Netheravon. The Hythe Wing deals principally with the rifle and light automatics, while that at Netheravon deals with machine guns. Courses are arranged in all weapons and for every grade of rank. Intensive training is given in all phases of work connected with the above weapons as well as in the theory of musketry, care of arms, etc., and higher aspects of the subjects not usually dealt with regimentally. For certain courses an entrance examination is required, and passing-out examinations are held. For certain appointments a certificate of passing-out from one of these schools is essential. At Netheravon instruction takes the form of higher study of the employment of weapons in war, and staff officers and senior regimental officers usually compose the classes. During the Second World War the Hythe Wing moved to Bisley.

Small Debts Courts. The S. D. C. of the sheriff in Scotland were estab. in 1937. Sheriffs were empowered to try civil causes for statutory penalties, and maritime civil causes where the penalty or claim did not exceed £12. This jurisdiction has been extended by the Sheriff Courts Act, 1907, so as to give the S. D. C. power to enforce claims up to £20 or less. An analogous court called the Debts Recovery Court, estab. in 1867 for the recovery of certain debts between £12 and £80, was abolished by the Sheriff Courts Act. Generally speaking, the Sheriff Court of Scotland has private jurisdiction in all causes not exceeding £50, and such causes are not subject to review by the Court of Session. Justices of the peace also have a small debt jurisdiction dating from 1795 which extends to claims not exceeding £5.

Small Holdings. Co. councils (including

councils of co. bors.) are empowered by the Small Holdings and Allotments Act, 1926, to purchase or take on lease land within or outside the co. to provide small agric. holdings exceeding one but not exceeding 50 ac., or if exceeding 50 ac., of an ann. value for income-tax purposes not exceeding £100, and the land may be purchased either compulsorily or by agreement; but if by the former method the council must first submit the proposed order under the Acquisition of Land (Assessment of Compensation) Act, 1919, to the Ministry of Agriculture for confirmation. If the council is satisfied that there is a demand for S. H. it is their duty to take action; but if it is their view that a loss will be incurred, they must obtain the approval of the Ministry of Agriculture, which dept. may contribute a sum towards likely losses up to 75 per cent thereof. The council may then either sell or let the land for S. H.; in the case of sale, one-half of the purchase price must be paid down and one-fourth may be secured by a perpetual rent charge, while the balance may be paid by half-yearly instalments extending over a period of fifty years. The council may in their discretion advance not more than nine-tenths of the purchase money to a smallholder to enable him to buy the land from the landlord ('landlord,' in this context, means the person who, for the time being, is entitled to receive the rent of the land from the council which has acquired the land). This sum will be repayable by a terminable annuity equal to the 'full fair rent' of the holding, payable in half-yearly instalments spread over a term of sixty years. If the holding be let, and not purchased, the tenant pays a 'full fair rent' or, in other words, the amount a tenant would be expected to pay on the assumption that the landlord did the repairs. Land let or purchased for S. Hs. may not be assigned or sublet without the consent of the council. Co. councils, having acquired land for S. Hs., may, before sale or letting, adapt it by erecting the necessary buildings, effecting repairs and so forth, or they may arrange with the tenant for the execution of any such improvement. The Act also gives them a general power of management of the land acquired by them for S. H., and they may make or guarantee advances to the owner of a small holding provided by them for the purpose of constructing, altering, or adapting buildings on the holding. In 1939 there were about 435 300 S. H. in Great Britain. In 1948 there were 437,698 S. H. in Great Britain (362,972 in England and Wales; 74,726 in Scotland). In England the average size is 71 ac., compared with Scotland's 59 ac., and an average of 47 ac. in Wales.

Smallpox, or Variola, contagious infectious disease characterised by the appearance of numerous 'pocks' or pustules. Its cause is not definitely known, but from the manner of its occurrence and distribution it is assumed that it is due to the activity of a specific micro-organism (virus). A low standard of nutrition and general uncleanness predispose to infec-

tion, but every case can be traced to a previous case. Since the ninth century the general course of S. incidence can be easily followed. It probably existed in the E. in early times, was brought to Europe by returning crusaders, reached the New World by way of the Sp. expeditions, and has penetrated to almost every clime in which contact with masses of Europeans has been made possible.

One attack renders the subject immune, and the milder disease of cowpox (see VACCINATION) may confer immunity. Thus a people subject to its ravages or compelling the practice of vaccination gradually acquires immunity for a period; but with lapse of time, if fancied security has led to a relaxation of laws dealing with prevention, the community becomes once more liable to attack. When introduced among a pop. previously unacquainted with the disease, its effects are likely to be particularly widespread and fatal. The symptoms commence with rigors, digestive disturbances, headaches, and pains in the back. In two or three days the eruption makes its appearance in the form of red papules, occurring chiefly on the face and upper part of the trunk, though the whole body surface may be involved. During the next two weeks the papules develop into vesicles containing clear fluid, and then into pustules. In the second week the febrile symptoms, which subside during the formation of the papules, recommence, and the patient is likely to become extremely exhausted. If progress is satisfactory, the pustules dry up, either by discharging their contents or by absorption, and brown scabs are formed which gradually clear away, leaving small depressions or 'pits' in the skin which are likely to remain permanently. The duration of an attack is about three weeks. Forms of S. of different degrees of severity are known as *Variola confluens*, in which the pustules become continuous; *discrete* S., in which the pustules remain separate; *modified* S., a mild form occurring in vaccinated or inoculated subjects; *hemorrhagic* S., a form in which hemorrhage occurs in the vesicles; and *malignant* S., a form of the hemorrhagic type which is particularly severe and invariably fatal.

One of the chief difficulties in the way of S. research lies in the fact that the S. virus is one of the filter-passing viruses, and consequently it is a difficult subject for scientific investigation. The filters referred to are composed of unglazed porcelain, which is capable of holding all but ultra visible viruses. Vaccination is no longer compulsory in Great Britain, but it is a sensible precaution, particularly for those who are contemplating travel abroad; it is required for entry into the U.S.A. See also JENNER, EDWARD.

Smalt, silicate of cobalt and potassium prepared by fusing roasted cobalt ore with quartz sand and pearl ash. The fused mass of blue glass is ground beneath water, and is extensively used as a pigment.

Smaragdite, bright green mineral, often of fibrous structure, belonging to the hornblende group.

Smart, Christopher (1722-71), Eng. poet, b. at Shipbourne, Kent, and educated at Cambridge. In 1751 Dr. Burney introduced him to John Newbery, the publisher, to whose periodicals he contributed. His *Poems on Several Occasions* appeared in 1763, in which year was pub. also his masterpiece, *A Song to David*, which, it has been said, was composed while the author was confined in a madhouse. This received great praise from D. G. Rossetti. A critical ed. of *A Song to David*, by E. Blunden, was pub. in 1921. See T. H. Ward, *English Poets*, 1904.

Smart, Sir George Thomas (1776-1867), Brit. musician, b. in London. He was a choirboy (later, one of the organists) at the Chapel Royal, and studied composition under Arnold. In 1822 he became organist at the Chapel Royal. S. was knighted in 1811, and became a favourite festival conductor. He wrote many church anthems and chants, and also taught. Some of his glees are still sung. Jenny Lind was his most famous pupil.

Smartweed, sev. species of *Polygonum*, called S. on account of their acid properties, e.g. *P. acre*, water S., and *P. hydropiper*, common S.

Smear Dab, see LEMON SOLE.

Smeaton, John (1724-92), Eng. civil engineer, b. at Al. Throp, near Leeds, and educated at Leeds Grammar School. He was intended for the law, but became a mathematical instrument maker, and turned his attention to engineering, visiting Holland and Belgium for the purpose of inspecting the chief engineering works there. His greatest work was the rebuilding of the Eddystone Lighthouse, burnt down in 1755. He rapidly rose to the summit of his profession. He was the surveyor and engineer of the Forth and Clyde Canal, engineer for the improvement of Ramsgate harbour, strengthened the foundation of the buttresses of the North Bridge, Edinburgh, and built other bridges in Scotland. See S. Smiles, *Lives of the Engineers*, 1861.

Smectymnus, pseudonym (formed upon the first letters of their names) of Stephen Marshall, Edmund Culamy, Thomas Young, Matthew Newcomen, and Wm. Spurstow. They were joint-authors of the work, *An Answer to a Book* (by J. Hall, bishop of Norwich) entitled, *an Humble Remonstrance. In which the original of Liturgy (and) Episcopacy is discussed*... (1611). Both the *Book* and the *Answer* gave rise to considerable controversy, in which, among others, Milton took part.

Smell, see under NOSE.

Smellie, William (1740-95), Scottish printer and scientist, b. in Edinburgh. One of his first literary undertakings was the first ed. of the *Encyc. Brit.*, entirely planned and compiled by him. He also trans. Buffon's *Natural History* (1781), and wrote the *Philosophy of Natural History* (1790-99). See life by R. Kerr, 1811.

Smelling Salts, preparation of ammonium carbonate together with perfume. The mixture is used as a restorative and for relief in nasal catarrh.

Smelting, see METALLURGY, *Electro-smelting*.

Smelts, species of *Osmerus*, a genus of Salmonidae found in Europe and N. America. They bear close resemblance to the salmon in habit and appearance, but they are of smaller size, and their natural habitat is the sea, although they frequently enter rivers for spawning and thrive in fresh water. *O. eperlanus*, the common smelt, is considered a delicacy when very fresh, and *O. mordax*, an Amer. species, is also eaten.

Smetana, Bedřich (1824-84), Czechoslovak composer, b. at Litomyšl. He studied pianoforte and theory at 'Proskch' Music School in Prague. After five years abroad he settled in Prague (1861), becoming conductor of the National Theatre (1866-74). In this period his first five operas were composed, *The Bartered Bride* becoming at once the most popular work of Czechoslovak music. It is a vil. idyll, merry, simple, and national, without using or imitating the folksongs. In 1874 he became deaf and gave up all musical work, but his creative power did not lessen. In two new comic operas, *The Kiss* (1876) and *The Secret* (1878), the humour is founded on a greater artistic maturity. In symphonic music S. created his standard work, *My Country* (1874-79), a cycle of six symphonic poems. S. was the founder of modern Czechoslovak music, though he learned much from the Ger. musical tradition. See life by Z. Nejedlý, 1924-29.

Smethwick, co. bor. of Staffordshire, England, 3 m. W.N.W. of Birmingham. Home of the epoch-making inventions of Boulton, Watt, and Murdoch. Its prin. industries are engineering, railway carriages and wagons, weighing machines, bicycles, metals, screws, nuts and bolts, and glass and electrical work for light-houses. Pop. 77,110.

Smew, or *Merganser albellus*, species of Anatidae in the sub-family Merginae. The male bird is chiefly white with black markings, the female is white with rufous markings, and both have a handsome appearance. They inhabit N. Asia and Europe from Kamchatka to Lapland, and frequently winter in Britain, but do not touch N. America.

Smigly-Ridz, Edward (b. 1886), Polish soldier and statesman, b. in Galicia. While he was a painter in Craów he joined Piłsudski when the latter formed the Polish legion, on the Austrian side, in the First World War. He added the alias of Smigly ('lightning') to his name at this time. In 1919 he was Piłsudski's co-adjutor in setting up the Polish state, and in repelling the Russian attack. S.-R. again helped Piłsudski in the coup d'état of 1926. On Piłsudski's death in 1935 S.-R., who had been designated by him as his successor, was made marshal and inspector-general of the forces. He organised Polish resistance to Germany in 1939. On Poland's def. at S.-R. went to Rumania. The new Polish gov., set up in Paris, was critical of S.-R.'s conduct of the campaign, and he was relieved of his functions as commander-in-chief and inspector-general.

Smiles, Samuel (1812-1904), Scottish biographer and social reformer, *b.* at Haddington, Scotland, and educated for the medical profession, graduating from Edinburgh Univ. He practised for some time at Leeds, but, abandoning medicine, became editor of the *Leeds Times* and an active social reformer. His writings include *Life of George Stephenson* (1857); *Self-Help* (1859); and *Lives of the Engineers* (1861). See autobiography ed. by T. Mackay, 1905.

Smirke, Sir Robert (1781-1867), Eng. architect, *b.* in London. He studied under his father and then visited Greece, Italy, and Germany. He was elected an R.A. in 1811 and knighted in 1832. His best-known work is the Brit. Museum, finished in 1847. His style was classic and heavy.

Smith, Adam (1723-90), Scottish political economist, *b.* at Kirkcaldy. After studying at Glasgow Univ. and Balliol College, Oxford, he was in 1751 appointed to the chair of moral philosophy at the first-named institution. He was friendly with Hume and many leading Eng. and Fr. literary figures of the day. He pub. in 1759 his *Theory of the Moral Sentiments*, and in 1776, issued *The Wealth of Nations*, the foundation of all works on political economy. This is the first work in which the principles of political economy are set forth scientifically, and Burke said that it was 'in its ultimate results probably the most important book that had ever been written.' It has passed through innumerable eds. (it is included in Everyman's Library) and been trans. into many languages. See also *ECONOMICS*. See lives by R. B. Haldane, 1887, and J. Rae, 1895; A. W. Small, *Adam Smith and Modern Sociology*, 1907; E. Ginsberg, *The House of Adam Smith*, 1934; and W. R. Scott, *Adam Smith as Student and Professor*, 1937.

Smith, Alexander (1830-67), Scottish poet and essayist, *b.* at Kilmarnock. He became a pattern-designer in Glasgow, but, having become known as a poet of promise was, in 1854, appointed secretary of Edinburgh Univ. After contributing to the *Glasgow Citizen* he pub. *A Life Drama* (1853), which was much admired. In prose he wrote *Dranthorpe* (essays, 1863); *A Summer in Skye* (1865); and two novels.

Smith, Francis Hopkinson (1838-1915), Amer. writer, *b.* in Baltimore, and educated as an engineer. Then he became a building contractor in New York city. He did much work for the U.S. Gov., among other things the foundation for the Statue of Liberty in New York harbour. He is best remembered in the U.S.A. as a writer of delightful tales of the old south, his most famous one being *Colonel Carter of Cartersville* (1891).

Smith, George (1831-95), Eng. philanthropist, *b.* near Tunstall, Staffordshire, of humble parents. He was an earnest social reformer, and in particular turned his attention to the problem of child workers, especially in brickfields and on canal boats. In 1871 he pub. *The Cry of the Children*, which resulted in the passing of

an Act for the gov. inspection of brick-yards.

Smith, Sir George Adam (1856-1947), Scottish scholar and divine; *b.* in Calcutta, India. He was educated at Edinburgh, Tübingen, and Leipzig. He was Heb. tutor at Free Church College, Aberdeen, from 1880 to 1882, and minister of Queen's Cross Free Church, Aberdeen, from 1882 to 1892; he became prof. of O.T. languages, literature, and theology at United Free Church College, Glasgow, in 1892. In 1909 he became principal of Aberdeen Univ., relinquishing this post in 1935. S. was knighted in 1916. He was Moderator of the United Free Church General Assembly, 1916-17, and chaplain to the king from 1933 until his death. He wrote extensively on biblical subjects.

Smith, George Murray (1824-1901), Brit. publisher, *b.* in London in 1838, he joined the firm of Smith Elder, of which his father was part-founder, and in 1845 became the head of the publishing dept. Energetic, bold, and astute, he soon secured the work of such authors as Charlotte Brontë, Thackeray, and Ruskin. He founded the *Cornhill Magazine* in 1860, and put Thackeray in the editorial chair. Five years later he brought out the *Pall Mall Gazette*. He made a fortune outside publishing, and used some of his capital to produce the *Dictionary of National Biography* (1885-1912), ed. first by Sir Leslie Stephen and then by Sir Sidney Lee. See memoir by Sir S. Lee, 1901.

Smith, Henry John Stephen (1826-83), Irish mathematician, *b.* at Dublin, and educated at Rugby and Oxford. In 1861 he was elected Savilian prof. of geometry and the same year became a F.R.S. In 1874 he was appointed keeper of the univ. museum. His pub. papers, collected after his death, related to three subjects, viz. the theory of numbers, elliptic functions, and modern geometry, and he was considered the greatest 'arithmetical' authority of his day.

Smith, Horatio (commonly known as **Horace Smith**) (1779-1849), Eng. man of letters, *b.* in London. He pub. in early life sev. novels and contributed to various periodicals. In 1812 he and his elder brother, James, pub. their joint work, *Rejected Addresses*, a series of parodies of the popular writers of the day. This pretended to contain the MSS. sent in to secure the prize offered by the managers of Drury Lane for the best address to be delivered on the occasion of the reopening of the theatre.

Smith, John (1580-1631), Elizabethan adventurer, *b.* at Willoughby, Lincolnshire. Even while at school he had a longing for the sea and for soldiering, and at seventeen, set out to realise his ambitions. He served in France and Italy, and then in the Austrian Army against the Turks. Left for dead on a battlefield, he was discovered by the Turks, carried to Constantinople, and sold into slavery. He slew his master, made good his escape, and reached England in 1605. The following year he joined an emigrant party destined for what is now the state of

Virginia. The whole colony would have perished but for the energy and resourcefulness of S., who assumed a natural leadership. While exploring the Chickahominy R. he was taken captive by the Indians. S. later became governor of the colony, succeeded in making the settlers work, and, in the meantime, saved them from starving by trading with the Indians and securing much-needed food. Later he explored and mapped Chesapeake Bay. Between 1614 and 1617 he explored and mapped the coast of the ter., which he named New England. His last years were spent quietly in England, where he busied himself writing books and making maps. His works include *Occurrences in Virginia* (1608); *A Description of New England* (1616); *True Travels of Captain John Smith* (1630), etc. See lives by C. D. Warner, 1881; A. G. Bradley, 1905; and E. K. Chatterton, 1934.

Smith, Joseph, see MORMONS, HISTORY OF THE.

Smith, Sir Keith Macpherson (b. 1890), Australian airman, b. at Adelaide of Scottish parents, and educated at Queen's School, S. Australia, and Warriston, Moffat, Scotland. He served in the Royal Flying Corps in the First World War, and, with his brother Ross (q.v.), was the first to fly from England to Australia in 1919. S. was knighted for this achievement in 1919.

Smith, Logan Pearsall (1865-1946), Amer.-born Eng. critic and essayist, b. in Philadelphia, and educated at the Penn Charter School, Haverford College, Harvard Univ., and Balliol College, Oxford. His ancestors were Quakers, and his father combined prosperous management of a glass-bottle factory with equally prosperous evangelism. His autobiographical *Unforgotten Years* (1938) gives an account of his ancestry. His years at Oxford confirmed his desire to devote his life to 'the delicate torture of trying to express in words what he felt and saw,' or, more concisely, to the study of the Eng. language and the writing of Eng. prose. He became known as the most polished Eng. stylist of his day, and his easy mastery of words and language is displayed at its best in his collections of *Trivia* (1918), *More Trivia* (1921), and *All Trivia* (1933), which were thoughts and comments longer than epigrams, shorter than Baconian essays, but combining the wit and wisdom of each. They had grace and rhythm, and if they lacked strength it was because S. was a spectator of life rather than a participant in it, and was not a profound enough thinker ever to become an influential moralist. S.'s pamphlet, *The English Language* (1912), embodied the first fruits of the new science of semantics (q.v.), or the meaning of words. He wrote on, and ed., the works of authors as different as Donne, Milton, and Santayana. Other works include *Sir Henry Wotton* (1907) and *On Reading Shakespeare* (1933). See R. Gathorne-Hardy, *Recollections of Logan Pearsall Smith*, 1949.

Smith, Naomi Gwladys Royde, see ROYDE-SMITH.

Smith, Robert (1689-1768), Eng. mathematician, b. near Gainsborough and educated at Trinity College, Cambridge, in 1716 becoming Plumian prof. of astronomy. He was the founder of the prizes, called after him, competed for by Cambridge wranglers.

Smith, Rodney ('Gypsy') (1860-1947), Brit. evangelist, b. in a gypsy tent at Woodford, Essex. A Roman, S. taught himself to read and write. At seventeen he met Gen. Wm. Booth at a Salvation Army meeting in Whitechapel Road. Booth invited him to become an evangelist, and S. became one of the most remarkable evangelists of modern times. He pub. his autobiography, *Gypsy Smith: His Life and Work* (1902), and sev. vols. of addresses.

Smith, Sir Ross Macpherson (1892-1922), Australian airman, b. in Adelaide and educated at Queen's School, S. Australia, and Warriston, Moffat, Scotland. He served in the Australian cavalry at Gallipoli, and with the Australian Flying Corps in Palestine. S. won the M.C. and bar, the D.F.C. and two bars, and the A.F.C. With his brother Keith (q.v.) he was the first to fly from England to Australia in 1919, and was knighted for this exploit in the same year. He was killed in an aeroplane accident.

Smith, Sir Sidney, see SMITH, WILLIAM SIDNEY.

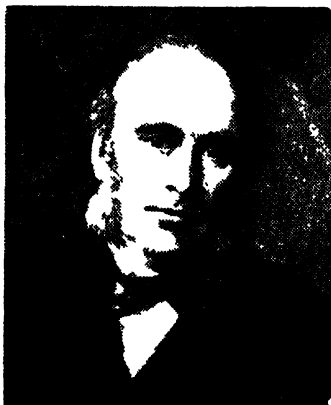
Smith, Sydney (1771-1845), Eng. cleric, author, and wit, b. at Woodford, Essex, and educated at Winchester and New College, Oxford. He took holy orders in 1794, and later, while residing at Edinburgh, founded, with Jeffrey and Brougham, the *Edinburgh Review* in 1802. He came to London in 1803, and in the following year attracted attention by his lectures. He became a popular figure in society, and was enrolled in the Holland House set. In 1807 he wrote the *Plymley Letters* in favour of Catholic emancipation. He was rector of Foxton from 1806, and appointed a canon of St. Paul's in 1831. He was the wittiest man of his day, and his conversation was brilliant. See memoir, with a selection from his correspondence, by his daughter, Lady Holland, 1855, and lives by S. J. Reid, 1884; G. Russell, 1905; G. Heseltine; and H. Pearson, 1915.

Smith, Theobald (1859-1934), Amer. pathologist, b. at Albany, New York. He was educated at Cornell Univ., and appointed director of the pathological laboratory of the Bureau of Animal Industry, U.S. Dept. of Agriculture. Here he specialised in the study of infectious diseases, particularly in farm animals. From 1915 until his death he was director of animal pathology at the Rockefeller Institute of Medical Research.

Smith, Sir William (1813-93), Eng. lexicographer, b. at Enfield, and educated at Univ. College, London. He compiled or ed. many useful works of reference, including *Dictionary of Greek and Roman Antiquities* (1842), and dictionaries of the Bible, of Christian antiquities, and Christian biography, etc., also various school series and educational handbooks,

including *The New Classical Dictionary* (1850). He was knighted in 1892.

Smith, William Henry (1825-91), Eng. politician and newsagent, b. in London. He developed his father's newspaper agency into the present business it is today, opening the firm's first railway bookstall at Euston in 1848. He entered Parliament in 1868, and nine years later became first lord of the admiralty under Disraeli. When Salisbury became Prime



W. H. Smith & Sons
WILLIAM HENRY SMITH

Minister S. was appointed first lord of the treasury and leader of the House of Commons. As leader of the House a strong will, disguised under a mild manner, secured for him the respect and affection of both parties. *Lunch* bestowed upon him the nickname 'Old Morality.' See life by Sir H. Maxwell, 1893.

Smith, William Robertson (1816-94), Scottish theologian, physicist, and archaeologist, b. at Keig, Aberdeenshire. He was educated at Aberdeen Univ., and studied theology at Edinburgh, Bonn, and Göttingen Univs. S. was appointed prof. of Heb. and O.T. exegesis in the Free Church College in 1870. He wrote the article 'Bible' for the 1875 ed. of the *Encyc. Brit.*, notable for its apparently heterodox admission of the non-Mosaic authorship of Deuteronomy. He was charged with heresy, and five years later removed from his chair by the Assembly on account of his article 'Hebrew Language and Literature.' In 1881 he was assistant editor of the *Encyc. Brit.* to Baynes, and a few years later succeeded the latter as editor-in-chief. He also held the post of prof. of Arabic in Cambridge Univ.

Smith, Sir William Sidney, commonly known as **Sir Sidney Smith** (1764-1840), Brit. sailor, b. in London; entered the navy in 1777, and was present at St. Vincent and Dominica. His most famous exploit was the defence of St. Jean d'Acro in 1790.

Smith College, non-sectarian college,

founded at Northampton, Massachusetts, in 1871 for the higher education of women. It has over 280 teachers, over 2000 students, and a library of 150,000 vols.

Smith, W. H. & Son Ltd., newsagents, booksellers, stationers, etc. The firm was founded in 1792 by Henry Walton S. and his wife Anna. Their youngest son, Wm. Henry, by his enterprise in getting the London newspapers away to the country on the morning coaches instead of on the night mail-coaches, became the pioneer of rapid newspaper distribution. He built up a great wholesale newspaper trade, and was among the first to use the railways to further his business. His son, W. H. S. II., estab. the firm's famous bookstall business. In 1905, when certain railway contracts had to be relinquished, W. H. S. II.'s son, the second Viscount Hambleden, was responsible for the decision to open some 150 shops to replace the lost bookstalls. Under his directorship and that of his son, the third viscount, who died in 1948, the shops more than doubled their number. The third Lord Hambleden also made the welfare of a large and scattered staff one of his chief concerns. The firm has a great wholesale trade at home and overseas, and, in addition to the shops and bookstalls, over sixty prov. wholesale houses. In 1919 it became a public limited company, with the honourable David S. as its governing director.

Smith-Dorrien, Sir Horace Lockwood (1858-1930), Brit. soldier. He was educated at Harrow, and entered the army in 1876, first seeing active service in the Zulu war of 1879. He also served in the Egyptian war, 1882, and in the Sudan campaigns of 1885-86 - D.S.O. He was commander-in-chief at Aldershot, 1907-12, and was made a general in 1912. In command of the S. Div., 1912-14. He commanded the 2nd Corps at Le Cateau, Aug. 1914, where he fought a great battle with von Kluck before joining the general retreat. Sir John French later criticised S.-D.'s tactics, but general opinion has since been almost entirely in his favour. In Dec. S.-D. took command of the Second Army, but he could not agree with Sir John French and retired. See his memoirs (1925) and life by C. Ballard, 1931.

Smithfield, famous cattle market of London, N. of St. Paul's. Since 1868 it has been the seat of the central meat market. It dates from the twelfth century, when it was associated with trials, executions, tournaments, battles, etc. Wat Tyler met his death here in 1381. It was also the site of the historic Bartholomew Fair. Many Protestant martyrs were burned at S. in the sixteenth century. S. suffered heavy bomb damage in March 1945.

Smithfield, vil. of Virginia, U.S.A., 60 m. S.E. of Richmond.

Smithfield College of Food Technology, sponsored by the I.C.C., with premises at Smithfield, London. It began in 1923 as a centre for technical training in the meat trade, and had five students. The college provides technical training for those engaged in the retail and wholesale food

trades, and for students preparing for the higher examinations that require a knowledge of food technology. There are evening classes and part-time day courses for employed students. The regular full-time day course lasts for two years.

Smith's Knoll, fishing ground off the coast of E. Anglia, England, being one of a series of shallow, sandy banks in the North Sea situated 20 m. off the coast of Norfolk between Yarmouth and Cromer, curving nearly parallel to it. It is about 17 m. long and the depths generally vary between five and nine fathoms. At certain seasons in the year, especially in the autumn, fish gather on S. K. in great numbers, and there are extremely heavy catches, mainly of herring.

Smithson, James Macie (1765-1829), Eng. founder of the Smithsonian Institution (q.v.). Washington, U.S.A., b. in France. He devoted his life to scientific work, chiefly chemistry and mineralogy. He was admitted a fellow of the Royal Society in 1787, some of his papers read before it being pub. in Thomson's *Annals of Philosophy*. See W. K. Riees, *Smithson and His Bequest*, 1880.

Smithsonian Institution, Amer. scientific institution, owing its origin to the benefaction of an Englishman, James Smithson, F.R.S. (q.v.) who in 1826 bequeathed £100,000 to the U.S. Gov. to found at Washington an institution for 'the increase and diffusion of knowledge among men.' The institution was formally organised in 1846 and the first building completed about 1851. From time to time various funds have been added to the original bequest. Legally the S. I. is an estab. having as its members the President and vice-president of the U.S.A., the chief justice of the U.S.A., and the President's Cabinet. It is governed by a board of regents composed of the vice-president, the chief justice, three senators, three congressmen, and six citizens of the U.S.A. The secretary is the executive officer and director of its activities.

Throughout its hist. the institution has carried on important scientific investigations and has conducted explorations in all parts of the world. Congress from time to time has given other important duties to it, so that to-day, in addition to the institution proper, ten bureaux, partly or wholly supported by Congressional appropriations, comprise the Smithsonian family, as follows: the U.S. National Museum (especially rich in collections illustrating Amer. natural hist., anthropology, geology, and Amer. hist. and industry), the International Exchange Service, the Astrophysical Observatory, the National Collection of Fine Arts, the Bureau of Amer. Ethnology, the National Zoological Park, the Freer Gallery of Art, the National Gallery of Art (under separate board of trustees), the National Air Museum, and the Canal Zone Biological Area. There are now six main buildings in the Smithsonian group, located midway on 'The Mall' in Washington, D.C.: the original Smithsonian Building, the Arts and Industries Building, the Natural Hist. Building, the Aircraft

Building, the Freer Gallery of Art (built in the style of a Florentine Renaissance palace), and the monumental National Gallery of Art (gift of A. W. Mellon).

The Smithsonian issues thirteen series of publs. pertaining to science and art, which are distributed free to libraries, colleges, and learned societies throughout the world. It also maintains a library of more than 1,000,000 vols., mainly on scientific subjects. There have been six Smithsonian secretaries: Joseph Henry (1816-78), Spencer Fullerton Baird (1878-1887), Samuel Pierpont Langley (1887-1906), Charles Doolittle Walcott (1907-1927), Charles Greeley Abbot (1928-44), and Alexander Wetmore (1945-).

Smith's Sound, see BAFFIN BAY and ARCTIC EXPLORATION.

Smits, Jakob (1856-1928), Dutch painter, b. at Rotterdam. He studied painting at the academies of Rotterdam, Brussels, Munich, and Vienna. In 1886 he settled down in the Belgian Campine region, where he found a bright country and poor people perfectly suited to his personality. The struggle between light and shadow dominates his works, in which impressionistic and expressionistic elements are bound together to a highly individual style. His main works are in the museums of Antwerp and Brussels.

Smock Mills, see under WINDMILLS.

Smoke. Visible S. is produced by the incomplete and uneconomic combustion of bituminous coal, when some of the volatile hydrocarbons of which escape unburned or partly burned. Invisible combustible gases accompany S. and represent an even greater loss of potential heat. In Britain annually two-and-a-half million tons of S. are emitted, and with the invisible gases there is an ann. waste of coal of five to ten million tons. Sulphur present in coal burns to form the corrosive sulphur oxides which are also emitted, together with much grit or fly ash. Nuisance from the last has grown considerably as a result of greater use of artificial draught and pulverised fuel.

Prevention.—In principle, S. may be prevented by confining the use of bituminous coal to plant in which combustion can be correctly controlled, and for all other purposes (e.g., open domestic fires) using only the smokeless derivatives of coal. Modern industrial technique, by mechanical and underfeed stoking, good design of plant, skilled attention, avoidance of overloading, etc., can ensure S. prevention in most plant. Electricity and gas are increasingly making difficult industrial processes smokeless, e.g. in potteries. Grit and dust can be eliminated by electrostatic precipitators, cyclones, wet washing, etc. Elimination of sulphur gases is carried out at Battersea and Bankside Power Station in London, but the process is expensive and there is lack of agreement on whether such washing is necessary if S. is absent and chimneys suffice only high.

Domestic S. is now recognised as an equally serious problem. Efficient new stoves and grates have been developed which will burn any type of smokeless

fuel (anthracite, gas and oven coke, and semi-coke of the 'Coalite' type). The Simon Report on *Domestic Fuel Policy* (1946) made many recommendations for improving the efficiency of fuel use in the home and at the same time abolishing its S. In 1948 the Ministry of Health required new houses built by local authorities to be equipped with approved appliances only. Gas, electricity, and central heating are making important contributions to smokeless housing, and in new areas dist. heating may be developed to provide heat by hot water or steam from a central boiler-house.

Effects.—S. affects health by diminution of natural light (up to one-half winter sunlight may be lost in large cities) and by respiration of polluted air, especially during the abnormal concentrations of S. met with in urban fog. Fog in London in Nov. 1948 doubled the respiratory death rate, and serious disasters occurred in heavy S. fogs in the Meuse Valley, Belgium and Donora, U.S.A. (1948). S. is now also believed to be a factor in the incidence of cancer of the lung. Serious damage to plant life, stonework, fabrics, metals, etc., is caused by smoke and sulphur gases. Including the fuel losses, the ann. cost of S. is estimated to be in the region of £100,000,000.

Legislation.—The main legislation is that included in the Public Health Act, 1936, under which nuisance has to be proved or may be defined (for black smoke only) in a by-law. New local legislation, from 1946, includes new positive principles such as the prior approval of new installations and smokeless zones. Recent city legislation in the U.S.A. is more drastic than any so far obtained in Britain, e.g. in St. Louis and Pittsburgh, where bituminous coal is permitted only for approved plant.

Organisation.—Administration of the law is the responsibility of local authorities, except for processes under the Alkali etc. Works Act, which are the concern of Ministry of Health inspectors. Local authorities also carry out systematic measurement of pollution under the supervision of the Fuel Research Station of the Dept. of Scientific and Industrial Research. The National S. Abatement Society (N.S.A.S.) is the prin. information and propaganda body and publisher, with local authority, industrial, and individual membership.

See H.M.S.O., *Domestic Fuel Policy*, 1947; A. Marsh, *Smoke: the Problem of Coal and the Atmosphere*, 1947; W. L. Hornby Steer, *Law of Smoke Nuisances*, 1947; N.S.A.S., *Guilty Chimneys*, 1948; *Smokeless Air* (quarterly jour.); and *Guide to Publications Relating to Atmospheric Pollution* (ann.); and Fuel Research Station, *Atmospheric Pollution* (ann.), etc., and other reports.

Smokeless Powder is more efficient than black powder. S. Ps. are all composed essentially of gun-cotton or other nitrated cellulose, which has been made into a paste with acetic acid or acetone; the paste is rolled into sheets, dried, and the horny mass obtained cut to size. Sporting

powders commonly used are the 'E.O.' and the 'Schultze.' The E.O. powder consists of rounded granules of gun-cotton, the sporting powder being coloured orange with aurine, and the rifle powder yellow with picric acid. The Schultze powder is produced by nitrating the finely divided cellulose obtained from macerated soft timber. Incomplete combustion results when the powders are ignited alone, and the use of a fulminating cap is general. See BALLISTITE; CORDITE; GUN; GUN-COTTON.

Smoker's Sore Throat, see SORE THROAT.

Smoke Weapons. The tactical use of smoke, both defensively to conceal the movement and disposition of troops and offensively to blind the enemy, is a practice of great antiquity. It is probable that the Byzantine *syphonistai* used chemical smoke, as well as incendiary arms. In medieval times large siege engines were employed to shoot 'carricasses' or bundles of rags and tow impregnated with pitch and sulphur to form a dense smoke.

Tanks carry one or more smoke mortars fixed outside the turret which project a small smoke bomb for a maximum range of 100 yds. on a fixed trajectory. This weapon can only be roughly aimed by alignment of the tank itself. Special smoke-generating ammunition can be fired from most types of modern field artillery, both for effect and to facilitate spotting by the observer. Mortars can fire similar ammunition. The greatest exponents of the offensive use of smoke in the Second World War were the Ger., and many weapons subsequently used to fire high explosive were originally designed to fire smoke or gas projectiles. They were served by a special arm of the service called *Nebeltruppen*, and the best known of such weapons was the *Nebelwerfer*, a multi-barrelled rocket weapon. The primary use of defensive smoke is to cloak preparations for an attack. It was so used by the Allies just before, and in the final battle of Cassino. A permanent smoke screen was later maintained across the upper part of the Apennine-Reno valley to deny to the enemy observation of an otherwise untenable position. Allied preparations for the crossing of the lower Rhine in the spring of 1945 were similarly covered by the extensive use of smoke. Fighter-bomber aircraft can be fitted with a device for laying a large and dense belt of smoke on the ground under cover of which gliders can be landed. But in order to do this they have to fly at 'nought feet', making them very vulnerable during the run-in.

In the navy smoke is used as a defensive weapon, playing an important part in the tactics of, say, a destroyer flotilla attacking a powerful enemy force in daylight. From a long belt of smoke they can emerge, fire their torpedoes, and then retire to safety. Such smoke is normally generated through the funnels, but destroyers are also supplied with special 'smoke boxes' for laying a more effective screen. During the battle of Sirte (March 22, 1942), in the Mediterranean,

Adm. Vian used smoke to enable his small force of cruisers and destroyers to get within effective range of the It. battle-convoy, and drive it off when it menaced a convoy to Malta.

Smoke floats, dropped over the side, were first used during the First World War, and were planned to provide cover for the blockships entering Zeebrugge on St. George's Day, 1918; but on this occasion the wind changed at the wrong moment and the smoke did not provide all the protection required. Smoke floats were supplied to certain independently routed ships in the Second World War to enable them to escape when attacked by submarines or surface ships. Smoke, shells, fired from guns, are only used in the navy to provide targets for A.A. practice. See also CHEMICAL WARFARE.

Smoking, see CIGAR; CIGARETTE; TOBACCO.

Smoky Mountains, see APPALACHIAN MOUNTAINS.

Smolensk: 1. Region of the R.S.F.S.R. The surface is hilly and rugged in the N., marshy in the N.W., and level in the south and E. About one-third is forest land and the soil is generally infertile, though well watered by the Dnieper and Dvina and tribs. of the Volga. There are also numerous lakes. Chief products are rice, oats, and flax, and manufacturing industries have greatly increased since 1917. Pop. 2,700,000. 2. Cap. of the region of S., on the Dnieper, 260 m. W.S.W. of Moscow. The act. part of the tn. is on the l. b. of the riv. and is surrounded by ruins of old walls. The Uspenski cathedral was formerly a place of pilgrimage. It is one of the oldest cities of Russia. A univ. was estab. here in 1919. The prin. industries are tanning, brewing, and the manuf. of linen and leather, etc. S. was the scene of bitter fighting during the Second World War. Pop. 156,700. See further under EASTERN FRONT IN THE SECOND WORLD WAR.

Smollett, Tobias George (1721-71), Brit. novelist, b. at Dalquhurne, Dunbartonshire, and educated at Glasgow Univ. In early life he was for a short time a ship's doctor, but after 1743 he settled as a surgeon in London, where he had come in 1739 in the hope of getting a tragedy, *The Regicide*, staged. It was this disappointment which prompted him to serve as a surgeon's mate and, on returning from the Cartagena expedition of 1741, he devoted himself to literature. In 1748 he pub. his first novel, *Roderick Random*, and then in quick succession came *The History of an Atom* (1749), *Pergrine Pickle* (1751) and *Ferdinand, Count Fathom* (1753). *Sir Launcelot Greaves* appeared in 1762 and *Humphrey Clinker* in 1771. Among his other works were *A History of England* (1757), in continuation of Hume's, an *Ode to Independence* (posthumously, 1773); a trans. of Voltaire, and his *Travels through France and Italy* (1766).

S. is one of the leading figures among the Eng. novelists of the eighteenth century, and his influence upon his successors has been very great. His work was very uneven in quality, but he had very

genuine humour, an excellent breezy style, unquenchable high spirits, and a great gift for characterisation, albeit, however, he sometimes veered perilously on caricature. His experience of life was of a varied kind and his inimitable sea characters are inspired by his experiences as a ship's doctor. As a novelist in the picturesque he set a fashion which is constantly recurring, while for buoyancy and the depiction of the odd in life, he is not inferior to Dickens. His sea worthies, if highly melodramatic, are full of life and humorous invention. Often involved in bitter controversy, extremely egotistical and often recklessly malicious, he was, on one occasion, imprisoned for a libel, an event which embittered him for the rest of his life. Sev. of his novels are reprinted in Everyman's Library. An ed. of the *Complete Works*, ed. by G. Saintsbury, was pub. in 1928. *His Letters*, ed. by E. S. Noyes, were pub. in 1926. See lives by R. Chambers, 1867; D. Hannay, 1887; H. H. Child, 1913; L. Melville, 1926; L. L. Martz, 1942; G. M. Kahrl, 1945; and L. M. Knapp, 1919.

Smolt, see under SALMON.

Smooth-haired Dachshund, see DACHSHUND.

Smooth Snake (*Coronella laevis*), common in south and central Europe and, in Britain, found principally in Dorset and Hampshire. It grows to a length of 2 ft., and it is brownish-red or grey in colour, with dark brown spots along its back. Like the adder it has a V mark on its back, but it is not venomous.

Smuggling, offence of importing or exporting either goods without paying the legal duties thereon or prohibited goods. The Smugglers' Act of 1736 made S. a felony; but the existing law on the subject is to be found chiefly in the Customs Consolidation Act, 1876, which, *inter alia*, subjects to forfeiture goods which have been the subjects of S. offences, punishes as a felony shooting at navy or revenue vessels or officers, imprisons or fines persons for signalling to S. vessels, and also punishes the offences of taking goods out of warehouses without payment of duties and procuring persons armed or unarmed to assemble for the purpose of S. In former days the coves and caves round the coasts of Cornwall, Devon, and N. Yorkshire were much resorted to by smugglers. On an average some 10,000 seizures of smuggled goods are made annually in the waters round Great Britain. Half these are seizures of tobacco, cigars, and foreign spirits. The reduction of duties and the improvement of communications were strong contributory causes to the diminution of S. The introduction in the Straits Settlements of the rubber restriction scheme (designed to enhance the price) led to a certain amount of S. from those colonies by dealers anxious to exceed their quota. For S. in the U.S.A. see under BOOTLEGGING AND PROHIBITION.

Smut, or **Bun**, name for the diseases of cereals and other plants, caused by parasitic fungi of the family Ustilaginaceae, allied to the Uredinales (rusts). In some cases infection occurs in the seedling stage

of the host plant, in others in the flower, the spores being produced in sooty black powdery masses often in the ovary, and sometimes in the anthers. Loose S. of oats, caused by *Ustilago avenae*, occurs wherever the oat is cultivated, but sprinkling the seed grain with 1 per cent of lysol or of formalin in water entirely prevents it. *U. maydis* frequently attacks maize and seriously diminishes the yields. Barley and wheat are also frequently attacked by other species. An aquatic grass (*Zizania*) when diseased with S. is sold in Japan to darken eyelashes. The spores are used also in the lacquer industry to produce rust-coloured ware.

Smuts, Jan Christian (1870-1950). S. African soldier and statesman; b. at Bovenplaats, Mtebeek West, in the electoral dist. of Malmesbury, W. Prov. of Cape Colony; son of Jacobus Abraham S., sometime member for Malmesbury in the Legislative Assembly. His parents were descended from Dutch and Fr. Huguenot immigrants. In 1886 S. entered Victoria College, Stellenbosch. He matriculated in 1888; and, having graduated at the Cape Univ., he went to England in 1891 as Eiden scholar. At Cambridge he took a double first in the law tripos in 1892, and graduated LL.B. from Christ's College in 1894. In 1895 he began practice at the Cape Tn. Bar. The Jameson Raid of 1896 made him a Republican; he was admitted to the Bar of the Transvaal the same year, and began practice at Johannesburg. In 1898 he became state attorney under President Kruger. In 1899 he pub. a statement of the Boer case against the Brit., entitled *A Century of Wrong*. In 1901 he was given supreme command of the Boer forces in Cape Colony, and proved a daring and able commando leader. Under Brit. rule he became colonial secretary of the Transvaal in 1907. With Botha S. worked untiringly to restore prosperity to the Transvaal, and, following the formation of the Union of South Africa in 1910, to promote good feeling and solidarity between the various racial groups within the Union. He was minister of interior and minister of mines for South Africa, 1910-12; minister of defence, 1910-20; minister of finance, 1912-13. He commanded the troops in Brit. E. Africa, 1917-18. Throughout the First World War S. was instrumental in quelling the pro-Ger. separatist groups within the Union, and continued to work for Anglo-Boer co-operation. Following Botha he became Prime Minister and minister for native affairs, Union of South Africa, in 1919, and he and Botha were plenipotentiaries at the peace conference, Paris, that year, when S. protested that the peace treaty lacked vitality, and declared that he signed it only to end a war. He placed his hopes in future world peace in the League of Nations, of which he was an ardent supporter. His gov. lasted till 1924, when he was heavily defeated by a combination of Nationalists and Labour. S. now had time to set down his own philosophy in *Holism and Evolution* (1926). Holism was the name he gave to his doctrine that an organism is more than its

parts by an ineffable essence of its whole, and that the emergence of new and larger wholes constitutes a real progress in the universe. In 1929 S. gave the Rhodes memorial lectures at Oxford, pub. the following year as *Africa and Some World Problems*. He became F.R.S. in 1930.

In 1933 Hertzog seemed to have attained most of his Radical Nationalist aims. His gov. was endangered by the rivalry of Hertzog himself and Tielman Roos, a former colleague. Hertzog therefore formed a coalition gov. with S. as deputy Prime Minister. Some Nationalists, under Dr. F. S. Malan (q.v.), seceded, forming an extreme Afrikaner opposition.



United Nations

SMUTS

In 1934 the coalition was strengthened when S.'s moderate Nationalist, pro-empire South African party merged with Hertzog's, the United South African National party being the result. On the outbreak of the Second World War S. at once advocated co-operation of South Africa with the Allies, while Hertzog and the extreme Nationalist, Dr. Malan, urged neutrality. In the debate which ensued S. prevailed with a vote of eighty against sixty-seven. Hertzog resigned, and S. formed a war cabinet (Sept. 5). At the election in July 1943, when the main issue was inevitably South Africa's continued participation in the war, S. achieved his greatest triumph, having a clear majority of sixty-seven in the House, and a popular vote more than double that of all his opponents combined. S. had become supreme commander of the Union defence forces in 1940; he was made a field marshal in 1941, being the first dominion soldier to hold this rank. Meanwhile, however, Dr. Malan was working to reunite the divided groups of extreme Nationalists. S. helped to draft the

United Nations charter in 1945, and in 1946 was the leader of the South African delegation to the United Nations Assembly in New York. He received the Order of Merit from King George VI. during the royal visit to South Africa in 1947. But in the general election in 1948 Malan's work of consolidation showed itself. S. was defeated by seventy-nine to seventy-five, Malan gaining his victory on domestic issues. S. became the leader of an Anglo-Afrikaner opposition once again, protesting vehemently against the gov.'s policy of extreme racial segregation. He was elected chancellor of Cambridge Univ. in 1948, delivering a speech against Communism on his installation. During a severe illness in June 1950 S. resigned from the leadership of the United party. Throughout his career S. has made a deep impression on public opinion in the Brit. Commonwealth and throughout the world for his profound sagacity and far-reaching comprehension. *See* lives by S. G. Millin, 1936; H. C. Armstrong, 1937; R. H. Kierman, 1943; and F. S. Crawford, 1947. *Also* B. K. Long, *In Smuts's Camp*, 1945; and B. Williams, *Botha, Smuts, and South Africa*, 1947.

Smyrna (Turkish Izmir), cap. of a vilayet of its own name, Asiatic Turkey, occupies the site of a former city on the slopes of a hill at the head of the bay of S. It is one of the most important and flourishing seaports of the Levant, and the second port of Turkey, carrying on a large trade in silk, cotton, carpets, wool, opium, madder, copper, olive oil, drugs, gums, figs, sponges, valonia, and raisins. The harbour is large, and ships of heavy tonnage can anchor close to the quays. Three-fifths of S. was destroyed by fire in 1922; the rebuilt tn. is modern and spacious, and is an important railway and commercial centre, with machine shops, foundries, tanneries, perfumeries, cotton-spinning, carpet-making, and many minor industries. S. is served by an electric tramway, and has railway connection with Kasaba and Ardın. S. was founded by Gks. probably about 1000 B.C., and 300 years later it formed part of the Ionian League. The first city was situated about 3 m. N. of the modern city, and was destroyed by Alyattes, the Lydian king, in 630 B.C. The second city was built by Antigonos, and many magnificent buildings were erected by Lysimachus. Earthquakes, fire, and plagues have ravaged the city at various times; it was besieged and practically ruined by Timur in 1402, and twenty-two years later it fell into the hands of the Turks, who have retained possession of it. By the treaty of Sévres, 1920, S. and the ter. surrounding it were placed under the administration of Greece for five years, Turkey retaining the sovereignty. This gave rise to much dissatisfaction. Greece had already, 1919, occupied the city, and fighting occurred between the Gks. and the Turks, who, under Mustapha Kemal, took S. in 1922. By the treaty of Lausanne (q.v.) S. was returned to Turkey. The Armenian and Gk. pop. was deported. Pop. (tn.) 200,100; (vilayet) 676,000.

Smyrna, Gulf of, in the Aegean Sea, on

the coast of Asia Minor, extends N.W. and S.E., 14 m. wide at the mouth and 18 m. at the head; length 40 m.

Smyrnæus, *see* QUINTUS CALABER.

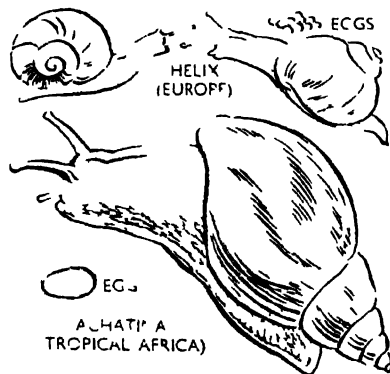
Smyth, Ethel Mary (1858-1944), Eng. composer, b. in London. She studied at the Leipzig Conservatoire, and then privately there with Herzogenberg. She had some works performed there, and after her return to England one or two appeared in London, including the Mass in 1893. Her earlier operas were produced in Germany. She lived much abroad, but in 1910 received the honorary Mus.D. degree from Durham Univ., and about that time joined actively in the movement for women's suffrage. In her later years she lived at Woking in Surrey and, regarding herself as neglected on account of her sex, composed less and less, but wrote a number of autobiographical books. She received the D.B.K. in 1922 and an honorary degree at Oxford in 1926. Her work was notable for its mastery of orchestral technique, and she held a foremost place among contemporary composers. Her works include the operas *Fantasio* (after Musset) (1898); *The Forest* (1901); *The Wreckers* (1909); *The Boatman's Mate* (after W. W. Jacobs) (1916); *Pête galante* (1923); *Entente cordiale* (1924); the Mass in D major; and many smaller orchestral works. Her pubs. include *As Time Went On* (1936); *Beecham and Pharaoh* (1935); and *Maurice Baring* (1938). *See* study by K. Dale in *Music and Letters*, Oct. 1944.

Smythe, Francis Sydney (1900-49), Brit. mountaineer, b. at Maidstone, Kent, and educated at Berkhamstead. He played a distinguished part in three Everest expeditions between the two world wars, and is remembered especially for his leads to the N. col and his solo climb at 28,000 ft. in 1936. He also climbed in the Himalayas, Alps, and Rockies. His exploits included the first ascent of Kamet and an attempt on Kangchenjunga. He has left valuable records of his experiences in the form of numerous books and unique photographs in colour and monochrome. Among his many pubs. are *The Kangchenjunga Adventure* (1930); *Kamet Conquered* (1932); *Camp Sir* (1937); *Adventures of a Mountaineer* (1940); *Alpine Ways* (1940); and *Rocky Mountains* (1948).

Snae Fell, highest point in the Isle of Man (2030 ft.), situated 54 m. S.W. of Ramsey. Great Britain and Ireland can be seen from the top of the mt.

Snail, name given to various air-breathing, gastropod-shelled molluscs, forming a great number of species, some of which themselves include many varieties. With the slugs (q.v.) they are divided into two sub-familios. One of these is characterised by a single pair of non-retractile tentacles, with the eyes at the base; a familiar example is the Brit. pond S. (*Limnaea stagnalis*); the members of the other sub-family have two pairs of retractile tentacles, with the eyes at the summit of the upper pair. The true S. are almost exclusively vegetable feeders, and are provided with cutting upper jaws and a rasping ribbon, or *radula* in the mouth.

Sea, land, and water S are found in all parts of the world, some land S living at great altitudes. The sexes may be distinct but S are often hermaphrodite, cross fertilisation still being necessary. Many possess a structure not found in other molluscs, it is a beautiful crystalline body (Cupid's dart) which is ejected during copulation from a sac specially constructed for the purpose. The *Achatina culica* is the largest S being 6.9 in from head to tail. It has been found recently in America but originates from Africa, it was introduced to California in equipment salvaged from the Pacific area during the Second World War. The Roman S (*Helix pomatia*) is also large and occurs on chalk downs in Britain. It is a



favourite table delicacy in France. The garden S (*Helix persia*) is common in Britain whilst the smallest group are the genus *Vertigo*. The garden *Vertigo* (*Vertigo altharia*) emits a peculiar odour when disturbed.

S are well equipped with varied sense organs especially those of balance and smell. Many S hibernate in the winter in the ground or beneath leaves and secrete an epibragm which seals the aperture. See E. Ellis *British Snails* 1926, and I. Step *Shell Life* 1927.

Snake, or Lewis, River (Shoshone) largest trib. of the Columbia R. It rises (as the S Fork) in a lake 7790 ft high in Yellowstone Park Wyoming U.S.A. and flows S and SW through Idaho N and NW between Idaho and Oregon, and between Idaho and Washington. Its length is over 900 m. Navigation is hindered by rapids and falls, of which the chief are the Shoshone Falls (209 ft).

Snake-bird, or Darter, name of several species of ciconiiform birds allied to the cormorant and pelican. The birds are sinuous in progress when swimming on lakes rivers, or seas to obtain their fishy

prey, and when this is seen the snake-like neck allows the head to dart forward to seize it the neck vertebrae being specially adapted for flexibility. The S are widely distributed throughout central and S America S Asia and Australia and very little in colour. *P. anhinga*, the Amer S inhabits tropical regions its general colour is greenish black, the tail is tipped with brown, the wings marked with silvery grey and the feathers are small and soft. The S nests in a tree and four chalky white eggs are laid.

Snake-charming This has been practised in Egypt and throughout the I from the earliest times. It is still common in Egypt and in India where the cobra is generally used. S is usually a hereditary calling and its successful performance seems to depend upon a knowledge of the nature and peculiarities of the reptile. The fangs are usually removed.

Snakefish, Red, see under CIIOTIA

Snake Indians, see SHOSHONIS

Snake Island, see ANGUILLA

Snake-poisoning The bite of venomous snakes varies in its poisonous effects not only with the nature of the bite and thus the amount of poison entering the blood, but with the condition of the snake and of the health of the person bitten. If the snake has recently bitten there will be less poison injected. The danger of S is not so great as is popularly supposed, even with the most deadly species the mortality is only about 10 per cent. The bite of the viper (adder) is seldom if ever fatal to healthy adults in Great Britain. The chemical nature of the virus has not been determined and no antivenoms are known. Apart from local and gradually extending inflammation there is action on the nerves both peripheral and central, with a varying degree of paralysis. Respiration is interfered with and unconsciousness rapidly occurs. In some cases the poison has little effect not more than that from the sting of a wasp and is remedied by giving stimulants. In any case all serious injuries should be applied at once if they are possible firmly tightened, and kept in place as long as possible. The wound should be scratched or cut to produce profuse bleeding whereby the poison may be carried away. From the first moment the wound should be sucked. In the use of force or fingers amputation is effective if performed immediately while in other regions the place may be completely cut out. It is essential to keep the respiration going and maintain the heart action for this purpose plenty of strong stimulant should be given, e.g. alcohol (but not in excessive amounts), ammonia, strychnine. In many cases the application of permanganate of potash solution or sodium hypochlorite solution to the wound is useful solid permanganate of potash, and cauterisation cause destruction of the tissue and are not now recommended. Artificial respiration should be practised when prostration is great. There is no doubt that the shock to the patient is inimical to recuperation, he should be cheered as much as possible, but at the same time kept quiet. Anti

toxins have been tried by Dr. Calmette, and experiments have shown good results. Animals have been inoculated with the poison in small doses, and the serum from them has been injected, producing some degree of immunity. The serum thus produced has not proved efficacious against poisons from other snakes, unless of a closely related species. *See also* POISONOUS BITES AND STINGS. *See* P. Manson, *Tropical Diseases* (12th ed.), 1945; *British Medical Journal*, 1950, pp. 517 and 1094.

Snake-root, name of the roots of various plants, supposed to heal snake bites, e.g. *Aristolochia serpentaria*, *Polygala senega*, *Polygonum bistorta*, and *Ophiorhiza mangora*.

Snakes (Ophidia), family of reptiles, all of which have a cylindrical and vermiform body, and most are covered with scales. They differ from the lizards, to which they are most nearly allied, in their lack of a shoulder girdle, eyelids, covering of the tympanum and bladder. Traces of limbs are discoverable in the boas and pythons, while, on the other hand, many lizards, notably the blind worm, are without limbs. Amongst amphibia the Apoda (Gymnophiona) bear a superficial resemblance to S. A marked characteristic of S. is the distensile b. bow, which enables the prey to be swallowed whole. Many S. possess fangs (modified teeth) in the upper jaw, having grooves for the venom which runs from modified salivary glands where it is produced; the forked tongue is harmless. A popular classification is that of poisonous or non-poisonous, and though of the important families the Boidae, or Pythonidae, include only non-poisonous S., while the Viperidae are all poisonous, the Colubridae, to which more than three-quarters of all the S. belong, contain both poisonous and non-poisonous forms. No external characteristics are known by which it is possible to distinguish at a glance those that are, and those that are not, venomous. With few exceptions all S. are covered with scales, which are skin folds, and the whole is frequently shed; on the heads of some are plates similar to those of lizards. A snake's skeleton is composed of a great number of vertebrae and ribs; locomotion is effected partly by the passage of lateral waves away from the head, and partly by the action of large scales on the under-surface of the body, each being attached to a pair of movable ribs. The gripping action and slight movement of the scales help locomotion. Most S. are oviparous, but some, including the viper (adder), bring forth their young alive. The hypnotic power of snake's eyes is universally credited, but careful observation of them in captivity suggests that at least the power is exaggerated. S. are of comparatively recent geological age, and are most numerous in the tropical countries. Some are only a few inches in length, while the anaconda is reputed to exceed 50 ft. In Great Britain there are three species only: the grass snake, the viper, and the rare smooth snake. *See* *Cambridge Natural History* (vol. viii.), 1901; G. A. Boulenger, *Snakes of Europe*, 1913; R. L. Ditmars, *Snakes of the World*,

1931, and *Reptiles of the World*, 1934; and N. B. Hodgson, *Mammals and Reptiles of the British Isles*, 1945.

Snakeshead, *see* OPHIOPOGON.

Snakewood, *see* LETTERWOOD; BROSI-MUM; BREAD-NUT.

Snapdragon, or *Antirrhinum majus*, species of Scrophularaceae, commonly grown in Brit. gardens. The labiate corolla, after it has been opened, closes with a snap, hence the name of the plant. The game known as snapdragon is played at Christmas in a darkened room, and consists of snatching raisins from a dish in which brandy has been lighted. *See also* ANTIRRHINUM.

Snatching Bargain, *see* CATCHING BARGAIN.

Sneek, tn. of the Netherlands, in the prov. of Friesland, 13 m. S.W. of Leeuwarden. It is a butter and cheese market, and distilling and tobacco making are carried on. It was the scene of fighting between Canadian and Ger. troops in 1945. Pop. 14,900.

Sneeuwkop, highest point in the Hottentot-Hollands mt. range, 8 m. from Somerset West, S. Africa. Height 5212 ft. The beacon on top is part of the first great triangle utilized in the geodetic survey of S. Africa.

Sneezewort, perennial herb (*Achillea ptarmica*), of the family Compositae, found in Europe, Asia Minor, and Siberia. The plant has a strong pungent odour. Its root stock is long and creeping, and when reduced to a dry powder may be used as a substitute for snuff.

Sneezing, violent expiration of air from the nose and mouth. It is caused by irritation of the nerve endings of the mucus membrane, either by nasal catarrh or by foreign substances, as in taking snuff. It is an involuntary reflex respiratory act, the stimulus being carried by the trigeminal nerve to the medulla, where it induces a reflex action. A quick inspiration occurs, followed by a violent expiration in which most of the air is driven through the nose. The glottis remains open throughout. S. may also be induced by stimulation of the optic nerve, by a bright light. Paroxysmal S. is a form of asthma.

Sneferu, *see* EGYPT. History.

Snehøtten (Norway), *see* DOVEFJELD.

Snell, Hannah (1723-92), female soldier, b. at Worcester. In 1745 she enlisted in the army of Carlisle, entering Guise's regiment of foot. She soon deserted and entered the marines as James Gray. She served in the E. Indies, and was wounded at Pondicherry, but her sex was not discovered. Her adventures were pub. in 1750.

Snell, Henry, first Baron (1865-1944), Brit. politician, b. at Sutton-on-Trent. As a lad he worked on farms, as a potman, clerk, etc.; in 1895 he became secretary to the director of the London School of Economics and Political Science; for some years he was a propagandist and public speaker on beh. of Socialism and the Ethical movement. He was elected to the House of Commons in 1922, and in 1931 raised to the peerage, and appointed parl. under-secretary of state for India.

Chairman of the L.C.C., 1934-37, and leader of the Labour party in the House of Lords. He wrote an autobiography, *Men, Moments, and Myself*, 1936.

Snell, John (1629-79), Scottish philanthropist, b. in Ayrshire; he fought on the Royalist side during the Civil war. He left a bequest providing for the education at Oxford of students from Glasgow Univ., now the S. Exhibitions at Balliol College.

Snellius, or Snell, Willebrord (1581-1626), Dutch astronomer and mathematician, b. at Leyden, and in 1613 succeeded his father as prof. of mathematics in the univ. there. In 1615 he attempted the measurement of the earth by triangulation, publishing the result in *Eratosthenes Batavus* (1617). He also discovered the law of the refraction of light (1621), and wrote *Cyclometricus de circuli dimensione* (1621), and *Tiphys Batavus* (1624).

Snellmann, Johan Vilhelm (1806-81), Finnish politician, philosopher, and writer, b. in Stockholm. S. preached Hegelianism, and was an ardent supporter of Finnish nationalism. He fought for the recognition of Finnish as a national language, and used his international reputation as a writer and thinker to publicise the nationalist aspirations of his countrymen. He was minister of finance from 1863 to 1866. See lives by T. Rein, 1904, and O. Sylwan, 1929.

Snell's Law, see under LIGHT.

Snelus, George James (1837-1906), Eng. metallurgist, b. in London. He revolutionised steel manuf. by the purification of pig iron in a basic lined Bessemer converter.

Snlatyn, tn. of Galicia, Poland, on the R. Pruth, 20 m. W. by N.W. of Czernowitz. There are tanneries and large horse fairs are held. Pop. 11,000.

Snipe, common name given to species of the genus *Gallinago* in the family Charadriidae; they are closely allied to the woodcocks in the sub-family Scolopacinae. The birds inhabit marshes, which they probe with their long, straight bills for the worms, insects, and molluscs on which they live. Their nests are made on the grass, and the eggs are four in number. The cry of the birds resembles the sound 'scape-scape,' and during the breeding season they make a peculiar drumming or bleating noise in their downward flight. The common S. (*G. collesus*) is some 10 in. long, and is mottled black and brown. *G. gallinula*, the Jack S., slightly smaller than the common S., and *G. major*, the great or solitary S., which reaches 12 in. in length, are found in Britain; *G. delicata*, Wilson's S., is the commonest species of America. On account of its darting flight the S. is a difficult bird to shoot, but S.-shooting is a popular sport for the expert.

Snipers, formerly called sharpshooters. Their regular use only became possible with the general adoption of the rifle. The skirmishers organised in fusilier or rifle regiments, whom it was customary to deploy in front of the infantry of the line after the Seven Years war, were the ancestors of the modern S. or 'traillieurs,' a

title still borne by some Fr. colonial regiments. Nowadays there are no specialised regiments of S., but the estab. of an infantry battalion in many armies provides for a section of S. S. customarily work in pairs of one marksman and one observer, both because sentinel observation wears the eye of the marksman, and because in order to obtain the greatest effect the target must be carefully selected. Sniping is an economical method in static warfare of maintaining an aggressive attitude without great expenditure of ammunition, and was so used by the Boers in S. Africa and by both sides during the trench warfare of 1914-18.

Snizort, Loch, deep inlet in the N. of Skye, Scotland, extending 12 m. inland.

Snodland, par. and vil. of N.E. Kent, England, on the Medway, 6½ m. S.W. of Rochester, with lime, cement, and paper works. Pop. 5000.

Snooker, see under BILLIARDS.

Snoring, abnormal form of respiration during sleep. It is characterised by deep inspirations and a noise of low pitch caused by the vibration of the soft palate and uvula as the current of air passes outwards to the mouth. It is usually caused by the mouth opening by relaxation of the jaw muscles, and may in that case be prevented by lying on the side. It may indicate a partial blockage of the nasal passage, e.g. by adenoids or catarrh, when medical treatment may be necessary to prevent it.

Snorri Sturluson (1178 or 1179-1241), also called **Snorre Sturlason**, and in Lat. **Snorro**, b. in Iceland, son of Sturla, a chief. He was educated at Odde by Jon Loftson, his foster-father, whose farm was a famous cultural centre. Aristocrat, administrator, and historian, S. S. was the greatest of the skalds (see SKALDS AND SKALDIC POETRY), in recognition of which he was raised to the rare dignity of skutillsveid (chief rank of the royal bodyguard). In 1199 he married Herdis, daughter of Berse of Borg (d. 1233). He became president of the Althing in 1215, first visited Norway in 1218, was again president in 1222—and the richest man in Iceland. S. S. married Hallveig Ormsdatter in 1233. From then he lost political power in a welter of intrigue that ended in his assassination at King Hakon's orders, save for a few poems, we have no important works prior to 1222, when S. S. completed the *Younger*, or *Prose, Edda* (*Uppsala Codex*), followed later by *Heimskringla*, a beautiful collection of sagas of the kings (see THORNSON). *Heimskringla* consists partly of skaldic verse by himself, partly of the poems of earlier skalds which were interwoven, and owes its title to the loss of the MS. first page, the second page beginning 'kringla heimskins...' ('the world's round ball'). The original was destroyed by fire (1728) at the Copenhagen Univ. library, one page only surviving because it was in Stockholm, where it was being copied by Eggertson, to whom, with Johnsson, we owe the present texts. Other works are ascribed to S. S. which form part of the 'Skalda,' ed. by Rask under the title of *Snorra-Edda dæmt Skaldur*. Though as a historian not

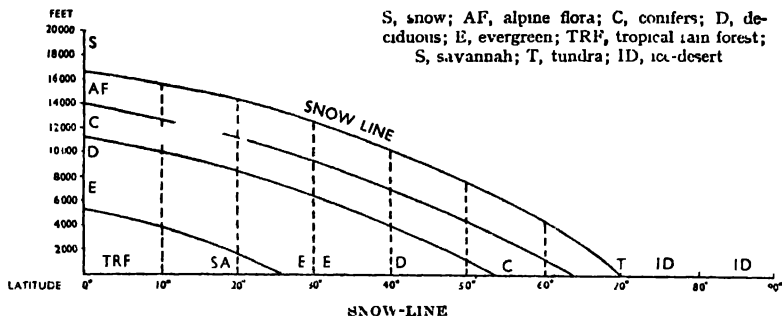
comparable with the contemporary Saxo-Grammaticus (*q.v.*), S. S. was a supreme poet whose powers entitle him to rank with the greatest of all time. His character sketches remain masterpieces, prefiguring modern drama of psychology as known in Ibsen. His handling of rhythm and nuance make for verse of imperishable interest. Few writers have more effective economy. See P. A. Munch and C. R. Unger, *Heimskringla* (Christiana, 1868; Viking Club trans. Series (trans. by Olive Bray); study by W. P. Ker, 1906; *The Olaf Sagas and The Norse King Sagas* (ed. by Samuel Laing) in Everyman's Library; E. Mønsen, 1932, and *Snorres Konge Sagar* (Gyldendal, Oslo), 1940.

Snottingeham, see NOTTINGHAM.

Snow is precipitation falling from the sky in the form of dry feathery particles, called snowflakes. Under the microscope individual flakes are seen to be composed

of many small crystals, the snowflakes are small and powdery (*poudré weather* in Canada), and strong winds easily raise the loose S. from the ground in such quantities that visibility is restricted considerably; it is then known as a blizzard or storm of drifting S. Such conditions are typical of polar regions or the centres of the cold continents such as Canada, Russia, and Siberia in winter.

In high lat. or altitudes S. lies perpetually; the limiting line of these regions is known as the S.-line, and is shown in the accompanying figure, where it will be observed that in lat. 70° N. S. is perpetual at sea level, but at the equator only above some 16,000 and 17,000 ft. high. The diagram is, of course, an attempt to show the average. Glaciers are formed from accumulated and compressed S. above the S.-line; by their melting just below the S.-line they provide a continual supply of water to streams such as the Nile and



The diagram shows a meridian of longitude (eastern side of continent).

of tiny crystals of clear ice fastened to each other in beautiful, usually symmetrical, hexagonal patterns. The crystals, which are so small that almost all the light is reflected and the S. appears white, have the shape of thin needles, hexagonal plates and prisms, pyramids on a hexagonal base, or prisms united with pyramids. The snowflakes may be any combination of these, the most usual being that of plates and needles into six-pointed fern-like stars, with parts symmetrically filled in to varying degrees. Ice crystals are formed only at temps. below 10° F. by direct sublimation on to some of the nuclei always present in the atmosphere. If the crystal collides with super-cooled cloud droplets they freeze on to it like rime (*q.v.*), and begin to form into an amorphous mass, such as granular S. or graupel, retaining, if the process is not carried too far, the original pyramidal or star-like shape. If, however, the cloud droplets are above freezing the S. becomes wet and begins to melt, reaching the ground as sleet or, if completely melted, as rain; sometimes this type of snowfall passes again through freezing regions to become solid again, soft hail, or in America 'sleet.' In conditions of very cold weather, when there is less actual moisture present in the

Indus, which would otherwise dry up in the warmer and drier regions they pass through. S. rarely falls south of lat. 40° N. in the N. hemisphere, though it is known in Algeria and Canton, the latter place being within the tropics.

S. is a bad conductor of heat, both on account of its material, and, in the case of collected fallen S., on account of the amount of air enclosed; its effect is, therefore, to prevent transfer of heat from the soil, a matter of immense importance biologically; on the other hand, for its temp. S. acts like a 'black body' radiator of heat and the air in contact with S. becomes very cold on clear nights. Red S. is due to the presence of a minute vegetable alga, *Protococcus nivalis*; minute bright red globules on gelatinous masses are found to some depth. It has been noted in the mts. of south Europe, Greenland, etc. A similar organism gives rise to green S., and the pollen from coniferous trees often covers the S. with a yellowish colour.

See W. A. Bentley and W. J. Humphreys, *Snow Crystals* (New York), 1931, and U. Nakamura and K. Hasikura, 'Physical Investigations on Snow.' Part II, 'Classification and Explanation of Snow Crystals, observed in the winter of 1933-34

at Mt. Tokai, and at Sapporo,' *Journal of the Faculty of Science*, Series II., vol. 1., No. 6, 1934.

Snowball Tree, see GUELDER ROSE.

Snowberry, or *Symphoricarpos racemosus*, species of Caprifoliaceae, native to N. America and frequently cultivated in Brit. shrubberies. It has upright, slender stems and spikes of pink flowers, followed by opaque white berries.

Snow-bird, or *Fringilla hiemalis*, species of Fringillidae found only in N. America. It is about half a foot in length, and in colour is white and grey with black markings.

Snow Blindness. The glare from snow may cause acute conjunctivitis after long exposure. This condition will be accompanied by acute pain and photophobia, and sometimes conjunctival hemorrhages.

Snow-bunting, or *Plectrophenax nivalis*, species of Fringillidae sometimes found in Britain, a winter visitor from N. Europe and Siberia. Its plumage in winter is white with the upper parts rusty-brown, in summer it is white and black. Breeding takes place in rocky and mountainous situations.

Snowden of Ickornshaw, Philip Snowden, Viscount (1864-1937), Eng. politician, b. at Cowling, Yorkshire. He attended the local elementary school. In 1886 he entered the civil service, and served in the excise dept. at Liverpool, in Scotland, and in the south of England. In 1891 he was permanently lame in a cycle accident, which made him an invalid for three years. During his convalescence he was converted to Socialism by hearing Emile Stacey lecture. S. joined the newly formed I.L.P., and became a member of its administrative council (1898). He was prominent in political agitation at Keighley, and ed. the *Keighley Labour Journal* (1898-1900). From 1903 to 1906 and again from 1917 to 1920 he was chairman of the I.L.P., and from 1906 to 1918 junior member for Blackburn. From 1922 to 1931 he represented Colne Valley. He was made privy councillor in 1924, and was chancellor of the exchequer during the short Labour administration. In 1929 S. resumed that office, and in Aug. of that year became extremely popular on account of the stand he made for Brit. interests at the Hague Conference on war reparations. In 1930, as chancellor of the exchequer, he gave warning of the need for national economy. His advice led to the appointment of the May Commission, and a political crisis ensued on the pub. of the report of that body. A reconstructed Cabinet under Ramsay MacDonald was formed with S. in his previous post (see NATIONAL GOVERNMENT). After the 1931 general election he became lord privy seal and was created a viscount. S. served as a member of royal commissions on canals and waterways, on the civil service, and on venereal diseases. His pubs. include *A Socialist Budget* (1907); *Socialism and Syndicalism* (1913); *Labour and the New World* (1921); *The Faith of a Democrat* (1928); and his *Autobiography* (1934).

Snowdon, highest mt. of Wales and of S. Britain, in Carnarvonshire, 10 m. S.E. of Carnarvon. It has five distinct peaks, of which the highest, Y Wyddfa, rises to 3571 ft. Lliwedd, the most precipitous, is famous with rock-climbers. Between the peaks are the picturesque passes of Llanberis and Aberglaslyn. The chief tourist centres round it are Llanberis, Beddgelert, Capel Curig, and Pen-y-Gwryd. From the first-named a rack and pinion railway to the summit was built in 1895. See II. R. C. Cur and G. A. Lister, *The Mountains of Snowdonia*, 1925, 1949; *Snowdonia* (H.M.S.O.), 1948; and R. J. North, B. Campbell, and Litchinda Scott, *Snowdonia*, 1919.

Snowdrop (*Galanthus nivalis*), perennial herb of the family Amaryllidaceae, found in Britain in early spring and often in the snow. The plant is bulbous and is sometimes seen growing wild in woods and fields. It has two tapering leaves and one pendant white flower on a tall stem.

Snow Leopard, see OX COE.

Snow-line, see under SNOW.

Snow-plough, machine for clearing snow from roads, railways, etc. A simple type is made of timber, a wedge-shaped frame of heavy haulks being dragged apex first, the sides throwing the snow sideways into ridges, leaving a clear path between. For railway work the wedge attached to the front of the engine is a half-pyramid, an edge of which runs from the apex upwards towards the engine. Where a heavy snowfall has to be cleared a rotary plough is used, consisting of a number of cutting vanes arranged in a rapidly rotating wheel. Hot-air blasts from jet engines have also been used to clear drifts.

Snow-shoes, broad flat shoe used in snow-bound luts. to prevent the feet from sinking beneath the snow. The N. Amer. shoe is from 3 to 4 ft. long. A hide webbing is mounted on a strong wooden frame-work. Special shoes are used by the Eskimo in order to cross floating or broken ice surfaces.

Snowy River, riv. of Australia, whose headwaters, including the Gungahlin and Eucumbene Rrs., rise in New S. Wales in the Great Dividing Range, the S. portion of which is known as the Snowy Mts. The S. R. commences near the N.E. slope of Mt. Kosciuszko and trends N.N.E. for about 18 m., receiving sev. tribs. rising in the Snowy, Ram's Head, and Perisher ranges. Then it turns E.S.E. after the junction with the Murrumbidgee and the Gungahlin Rrs.; these rise near Bull's Peak and Bald Hill. Flowing a short distance E.S.E. the S. R. joins the Crackenback R., and 1½ m. distant the Eucumbene R. joins the S. R. The S. R. finally flows south to the Victoria border, and continuing in this direction reaches the sea in Bass Strait near the inland tn. of Orbost. The total catchment area is 5210 sq. m., and the maximum length of the riv., from N. to S., is 300 m.

Snowy River hydroelectric scheme.—A Bill introduced in May 1949 in the House of Representatives, Canberra, establishes under the Commonwealth's defence powers a commission to build the S. R. hydro-

electric and irrigation undertaking, the greatest developmental conservation project ever conceived in Australia. The headwaters of the S. R. are to be diverted to flow W. and N. into the Upper Murray and Tumut Rts. The power to be eventually developed will exceed the total electric power used for all purposes by New S. Wales and Victoria, and will be decidedly cheaper than if generated from coal. See *Report of the Snowy River Investigation Committee on the Utilisation of the Waters of the Snowy River* (Government Printer, New S. Wales), 1941.

Snuff, inhalant powder manufactured from ground tobacco leaves and stems (i.e. the mid-rib of the tobacco leaf). Cortez discovered that S. was used by the Mexicans early in the sixteenth century, and the general habit of snuffing in Europe started in Spain about 1620. In Britain regular manuf. began in the middle of the eighteenth century and developed rapidly. In fashionable circles smoking gave way to the new craze, which persisted until ousted by the cigar early in the nineteenth century. At this time S. was made by powdering tobacco, which was afterwards coloured and perfumed with various scents. S. is manufactured at a great variety of mixtures, from dry, as powder, as in the Irish and Welsh 'High Dried' S., to the heavier humid 'Rappee' type. It is ground to varying degrees of fineness by methods which differ according to the class of S. Alkaline salts are used in the process and flavour is added as required. All S. are sifted in the final stage to ensure obtaining the correct 'grain,' or degree of fineness. The introduction of S. flavoured with menthol and similar substances has proved very popular of recent years.

Snyders, Frans (1579-1657), Flem. painter, b. at Antwerp. He studied under Henrik van Balen, then travelled in Italy for a time, and finally settled at Brussels. He excelled as a painter of still-life and animals, and executed fine battle-pieces.

Soane, Sir John (1753-1837), Eng. architect, b. near Reading. He distinguished himself at the Royal Academy schools, and completed his studies abroad. In 1788 the Bank of England was entirely rebuilt from his designs. His collections of paintings, chief among which are Hogarth's series, *The Rake's Progress* (1735) and *The Election* (1755), and his antiquarian museum, he bequeathed to the nation in 1835, and the collection is now to be seen at Sir John S.'s house in Lincoln's Inn Fields. See study by H. J. Birnstingl, 1925.

Soap. Substance which possesses detergent and cleansing properties. It is the salt of an alkali and fatty acid. Many types of S. are formed by this combination, depending on the type of alkali and fatty acid, and, for example, if sodium hydroxide (NaOH) is used to saponify stearic acid, a hard brittle S. is the result (i.e. sodium stearate), but should potassium hydroxide (KOH) be used as the alkali and oleic acid as the fat, then a soft S. is produced, the consistency being that of petroleum jelly (i.e. potassium oleate). As huge quanti-

ties are used every year the S. maker must turn to the oils and fats which are in abundance, i.e. palm oil, tallow, and coco-nut oil, etc. A blend of these fats is melted and pumped into a large kettle and kept boiling, during which time a stream of approximately 30 per cent sodium hydroxide is run in, the exact amount being determined previously by the saponification values of the fat charge. From time to time water is added to help the mass keep liquid and controllable, the amount of water being determined by the skill of the S. maker. When the fats are completely saponified (that is when all the fats have been fully converted into S.), salt (sodium chloride) is added to free the grains of S. from the lye; this is known as 'graining' the S. After setting a given time the lye is run off for further processing, and the remaining S. is boiled again and 'fitted,' i.e. partially drained. The mass is then allowed to settle and the neat S. is drawn off and run into cooling presses or frames where it sets and is subsequently cut in bars or cakes ready for use. The fat content of the 'fitted' soap is approximately 63 to 65 per cent.

Soft Soap.—A blend of suitable vegetable and animal oils is placed in the pan, heated, and then saponified with caustic potash of a given strength to yield a S. containing approximately 38 to 40 per cent oil content.

Marine or Salt Water Soap.—This is usually coco-nut oil or palm kernel oil, saponified by the 'cold process,' with caustic soda. For example, 100 lb. of refined coco-nut oil are heated to 95-100° F. in a pan (usually enamel or stainless steel), and 50 lb. of caustic soda solution 72 Twaddle are run in at a steady stream, care being taken throughout to keep the mass stirring. When a uniform appearance is reached, the mixture is run into a wooden frame and covered for approximately 24 hrs. Saponification takes place during the time the mixture is in the frame. As this soap is not boiled the process is known as the 'cold process.'

Toilet Soap.—This is a neutral S., containing approximately 88 per cent fatty acids. The S. is made from a blend of the finest oils and fats, previously deodorised and decolorised. A suitable lit. charge would consist of approximately 40 per cent refined tallow, 10 per cent arachis oil, 35 per cent earth-bleached palm oil, and 15 per cent 'Cochin' coco-nut oil, saponified with caustic soda and 'fitted' as in the hard process. As the boiled S. contained only 63 per cent fatty acids, it is necessary to dry out the excess moisture to reach 88 per cent fatty acids. The procedure is as follows: The neat S., taken from the pan after settling, is pumped into a closed vessel holding approximately 5 to 10 tons, where additions such as lanolin, almond oil, etc., are added as super-fattening agents, and it is then delivered on water-cooled stainless steel rollers and stripped off into set ribbons, which drop into an automatic drying chamber and come out as S. chips when the required percentage of fatty acids has been reached. The chips are transferred to a mixing chamber, where

the dyes and perfumes are added, which are then milled to make the S. plastic and homogeneous. The S. is now ready to meet the plodder, where it is compressed and extruded in long rods and cut into lengths of a given weight and finally stamped in various shapes and forms.

Shaving Soaps.—These can be made by the same process as toilet S., but with a varying fat charge and alkali. A satisfactory shaving S. stick can be made from a blend of refined tallow tittle (38° C.), distilled oleic acid, coco-nut oil, and earth-bleached palm oil. This charge is saponified with a mixture of 70 per cent caustic soda and 30 per cent caustic potash, to a content of 63 per cent, and subjected to the toilet S. procedure.

Shaving Cream.—This is usually shaving S., slightly adjusted by addition of glycerine, water, and various oils to render it emollient and creamy.

Many other types of S. used in industry are made to various formulæ and specification, as S. are used extensively throughout practically all trades; cosmetics, paints, leather, lubrication, disinfectants, and polishes are a few typical examples.

MODERN DETERGENTS: The value of materials possessing wetting and detergent properties has been recognised for well over half a century. Among the earliest products of this type was sulphonated castor oil or Turkey red oil, which even to-day finds a use, particularly in the textile industry, as a cleaning, softening, and wetting agent. The detergent properties of various alkaline salts have also been utilised for many years, and to-day such products are still widely used in bottle washing connected with food industries. None of these early products, however, could be classed under the same heading as the surface active types to which the term detergent generally applies to-day.

After the late 1920s there was little commercial development of products of the latter type, until sulphonated fatty alcohols were introduced. These products possessed many important properties not held by the earlier detergents, and even superseded those of S. in many respects. For example, they were neutral in aqueous solution; better in wetting and detergency; free from scumming or lime S. forming in hard water; of high surface activity in both alkaline or acid media, a property of great use in certain industrial metal cleaning and pickling operations. These were, however, based on higher alcohols such as lauric alcohol derived from vegetable fats, such as coco-nut oils, or stearyl and cetyl alcohols derived from animal sources, such as tallow. It was not until some years later that the modern detergent, derived solely from petroleum, was introduced. These modern detergents, with their powerful wetting detergent and emulsifying properties, played a major part in relieving the shortage of natural fats during the war years, which made available increased supplies of the latter for edible purposes.

Since the 1930s other types of synthetic

organic detergents have been developed and made commercially available, and from a position of relative insignificance they have grown to one of major importance. Although there are over 500 trade-named synthetics, of which 200 are detergents of a sort, there are only three main classes. These are (1) anionics, (2) cationics, (3) non-ionics. The *anionics* are those surface active products which ionise in water to give organic anions such as are to be found in the sulphonated fatty alcohol types, e.g. sulphonated lauryl alcohol, sulphonated stearyl alcohol, and sulphonated cetyl alcohol are products of the class. It is from this (the most important) class that the basis of most soapless detergents of the household soapless washing powders and hair shampoos are drawn. The *cationics* are those which ionise in solution to give an organic cation. These products, although they show detergent properties, have found prin. application as germicides. Examples of this type are the quaternary salts called cetyl dimethyl benzyl ammonium bromide, cetyl pyridinium bromide, and chloride, etc.

The *non-ionics* are generally liquids or waxy solids, which are chemically polyoxyethylene derivatives. These consist of a hydrophilic (or water loving) portion of the molecule, and a lipophilic (or oil loving) portion of the molecule, the latter being derived from a wide variety of chemical classes, such as fatty acids, alcohols, thioalcohols, alkylphenols, and sorbitan esters. In this class of detergent in general their solubility decreases as the temp. rises. They are compatible with hard or sea water, are neutral, and while showing less tendency than other detergents to de-fat the skin, are poor in foaming quality. They are mainly used to enhance the detergency of many anionics, particularly the alkyl aryl sulphonates when employed in washing fabrics in any type of water.

Attempts have been made by enterprising firms to form a hard bar type of soapless detergent, but although good cleansing properties have been secured, the high price and inferior lathering qualities of the soapless cake have prejudiced competition with the better toilet S. of to-day. The uses of soapless detergents are numerous; they range from the simple liquid hand washer to important processes connected with metal cleaning and plating, food, cosmetics, chemicals, germicides, laundering, to the finished textile industries embracing dyeing, wool, cotton, linen flax and artificial silk preparation, treatment and finishing.

Soap-berries, fruits of the tree *Sapindus saponaria*, a species of *Sapindaceæ*. They make a good lather in water, and are therefore used at times instead of soap.

Soapstone, see TALC.

Soapwort, or Fuller's Herb (*Saponaria officinalis*), species of *Caryophyllaceæ*, a native of W. Asia and Europe, frequently found in Britain. Its leaves have the peculiarity of lathering when rubbed in water.

Soar, riv. of Leicestershire, England, rising just within the Warwickshire

borders. It flows through Leicester and Loughborough, to Ratcliff, where it joins the Trent, 9 m. S.W. of Nottingham, and 11 m. E.S.E. of Derby. It is navigable to Leicester. Length 40 m.

Sobelsohn, Karl, see RADEK, KARL.

Sobieski, see JOHN (Kings of Poland), John III.

Sobieski, Brothers, see ALRANY, COUNT.

Socage. Tenure by S. was one variety of feudal tenure of land in England after the Conquest. Such tenure was (a) *Free S.*, the tenant (socman) holding by certain fixed and specified services, such as ploughing the lord's land, or by a determinate rent and fealty. (b) *Villein S.*, a tenure by certain but menial services.

Social Anthropology, or Cultural Anthropology, is that section of anthropological studies (see ANTHROPOLOGY) which deals with social organisation and culture. Up to the present it has been concerned with these among the simpler or more primitive peoples of the past (prehistoric or historic) and of to-day; it has therefore close links with archaeology and prehistory, and with 'geographical' descriptions of the more primitive regions of the world.

Beginning unsystematically with the reports of Gk. and medieval travellers, and of European explorers from the fifteenth century onwards, S. A. achieved a systematic form in the nineteenth century. To this the study of the Stone Age, the newer views on historical method, the development of conformational religion, wider linguistic studies, and the adoption and improvement of systematic methods in field work made essential contributions. In Great Britain the Cambridge expedition to the Torres Straits, organized by A. C. Haddon, marked a definite advance, as did the work of Franz Boas in the U.S.A. Sir J. Frazier, W. Robertson Smith, and E. A. Westermarck produced fresh and far-reaching results by their methods of organizing and interpreting documentary and other material; and later Elliot Smith and W. J. Perry published, though controversial, interpretations. In the U.S.A. L. H. Morgan, Lowie, Froeber, and others founded and developed systematic work. Fr., Dutch, and Ger. students also made contributions, those of the sociologist Durkheim and the psychologist Lévy-Bruhl being of special importance. The main results of these studies has been the amassing of fact and the growth of theory on such matters as early forms of marriage and the family, the function of kinship, primitive economic organisation, the role of chief and king, folk-lore, magic, religion, and the supernatural generally.

One of the theories offered in explanation of early social development is that different racial units progressed independently of each other and that their social progress was evolutionary, depending on an increasing experience. As the race improved physiologically, so it improved socially, the improvement being further hastened by growth of numbers and the consequently greater need for some sort of social code, both ethical and economic.

This view, however, is criticised by those who hold that the various races absorbed ideas of social development from each other, an absorption which increased in degree with the increase of means of intertribal communication, pointing to a general movement of diffusion of social order. During recent years, however, the application of psychological research has shed a clearer light upon the available material, and the diffusionists appear to be more in accord with psychological conclusions which indicate that an isolated racial unit is incompetent to translate itself into a higher stage of society through its experience, as evolutionists declare, and that, since the advance does take place, it is due to psychological development within itself. Among the later schools is the functional group, which expresses the belief that each successive stage of social progress carries the human being with it in its progressive stride. More important, however, has been the view of this group on the essentially interrelated character of all social phenomena, and their insistence that each feature—however irrational at first sight—has its part to play in the totality.

For authorities on S. A. in Africa see under AFRICA, *Social Anthropology*.

See F. Boas, *The Mind of Primitive Man*, 1911; A. Radcliffe-Brown, *The Andaman Islanders*, 1911; E. A. Westermarck, *Origin and Development of Moral Ideas*, 1917; R. Lowie, *Primitive Society*, 1921; F. Ginsberg, *Psychology of Society*, 1921; B. Malinowski, *Argonauts of the Western Pacific*, 1922; W. H. Rivers, *Social Organisation*, 1921; and L. H. D. Buxton, *Primitive Labour*, 1924.

Social Contract, term used for a certain theory of the origin of human society advanced by Hobbes in the seventeenth century, and then discussed by Hooker, Locke, and others. It was first worked out in detail by Rousseau. See also CONTRACT SOCIAL; GOVERNMENT, *Origin of Government*; POLITICS.

Social Credit, economic doctrine associated with the name of Maj. C. H. Douglas, its originator and chief exponent. S. C. stems from two main ideas: (1) that past 'progress in the industrial arts' is the heritage of the community and (2) that the community can be given possession of its heritage by securing to it, as distinct from the banks, the enormous if not unlimited profits of money creation. After the First World War Maj. Douglas was impressed both with the profits of money creation and with the lamentable contrast between the actual living standards of a world of unemployment and the potentialities of science, machinery, and modern organisation. As he saw it 'poverty in plenty' was due to nothing but a simple flaw in the price system—a flaw for which he offered a remedy in his 'Douglas Scheme' of S. C. Money-demand is the mainspring of commercial and industrial activity and money was not doing its job. It did not all go round and round. A part of the money spent to-day fails to reappear in due course as purchasing power in the hands of customers.

This view was set out in the famous *A + B Theorem*: *A* payments were those made to individuals (wages, salaries, dividends, etc.); *B* payments those made from firm to firm (for raw or semi-finished products, bank services, etc.). The *B* payments failing to reappear as purchasing power necessitates the consumer being given money *in lieu*: the gov. must make him a present of the money and, since it is to restore a shortage, here is opportunity to give money away without risk of inflation. Thus the flaw in the price system requires the happiest of remedies. 'Dividends for all' and the reduction or abolition of taxation become possible if the necessary and proper issues of money are but large enough. Maj. Douglas wants taxation abolished as a 'gross infringement of the liberty of the subject' and has proposed National Dividends of substantial amounts; all in addition to his basic proposition of the 'Just Price' an ingenious discount arrangement which seeks to meet the usual danger of too much money—inflation. Selling a shilling article at the just price of (say) 9d., the shopkeeper could look to the gov. for a subsidy of 3d. If tempted by rising costs to charge an extra penny he would know that customers would hardly pay him 1s. 1d. for what they could buy at 9d. elsewhere. The subsidy percentage was to be fixed by the proportion of consumption to production; which at first sight seems to embody a more scientific up-approach than that of simply offsetting lost *B* payments. Whilst any idea that the state can have a bottomless purse at its disposal is illusory it is now a commonplace that in a slump it is highly desirable to put (new) money into the hands of potential spenders. Reflation as distinct from inflation is no threat to monetary stability; on the contrary. The need for adequate spending as a (first) remedy for unemployment was by no means generally accepted when Maj. Douglas put forward his proposal and he is entitled to a share of the credit for the change of atmosphere. As Keynes says in his *General Theory* (1936): 'The great puzzle of Effective Demand [is] not . . . mentioned . . . in the whole works of Marshall, Edgeworth, and Professor Pigou. . . . It could only live on fictitiously in the underworlds of Karl Marx, Silvio Gesell, or Major Douglas.' 'The strength of Major Douglas's advocacy has . . . largely depended on orthodoxy having no valid reply to much of his destructive criticism. On the other hand . . . much mere mystification . . . a private perhaps but not a major in the brave army of heretics. . . . Maj. Douglas was right, if not original, in claiming that the profits of money creation should (in principle) accrue to the community: he was wrong in fantastically overestimating the amounts available. The error is bound up with his failure to see the essential difference between a ticket and a pound note; which again is bound up with his confusion on the subject of money cancellation.'

S. C. made a wide appeal between the wars, particularly in the great slump.

Like Keynes's more modest but more realistic full employment proposals, it offered a way out of the economic morass without recourse to policies of nationalisation and Socialism. Little is now heard of the movement; it is not likely to recover from the blow dealt it by Maj. Douglas himself in failing to give a practical demonstration of S. C. in Alberta at the invitation of Prime Minister Aherhart (q.v.) and his 90 per cent S. C. majority. See C. H. Douglas, *Credit Power and Democracy*, 1920, *Economic Democracy*, 1920, and *Social Credit*, 1933 (revised); P. Maitrot, *The Douglas Manual*; W. R. Hiskett, *Social Credits or Socialism*, 1935; W. R. Hiskett and J. A. Franklin, *Searchlight on Social Credit*, 1939; and Labour Party Pamphlet, *Socialism and 'Social Credit'*.

Social Hygiene, see under **HYGIENE**.

Social Insurance, private or state service for the prevention of individual poverty resulting from hazards of personal fortune over which individuals have little or no control. The question of S. I. was among the first to which the Brit. Gov. attended when, during the Second World War, they began to develop a programme of reconstruction for the future. In June 1941 the gov. invited Sir Wm. Beveridge (q.v.) to conduct a comprehensive survey of existing schemes, and some eighteen months later he presented his report on S. I. and Allied Services (Cmd. 6404), an outline policy covering 'all citizens without upper income limit . . . all-embracing in scope of persons and needs.' It did not purport to be a complete and final scheme, ready for immediate translation into legislative form. Further, the plan was based on three assumptions: first, the institution of a scheme of children's allowances; second, the framing of a comprehensive health service; and third, the avoidance of mass unemployment. The gov. accepted these assumptions as necessary prerequisites to an improved and comprehensive plan of S. I. The gov.'s own independent proposals for a national health service were then already under consideration, as well as their policy for maintaining a high and stable level of employment after the war. Also, their plan for a scheme of family allowances had been prepared. The gov.'s final proposals, which were pub. in Sept. 1944 (Cmd. 6550), embodied a great part of the Beveridge plan.

These proposals assumed that there must be both an increased rate of sickness and unemployment benefit and retirement pension, and a system of family allowances which would contribute substantially to the maintenance of growing children. It was decided that the cost of these latter allowances ought to be met from the proceeds of taxation, and therefore that they were outside the scheme of S. I. properly so called. With that one exception the proposals adhered to the underlying principle that freedom from want must be achieved in the first instance by S. I., i.e. that benefits must be earned by contributions. This principle has long been one of the essential features of Brit. social legislation, and the gov.'s policy assumed that

it still reflected the wishes and the characteristics of the people. Contributions from insured persons and their employers, in these proposals, covered only part of the ground. It was calculated, therefore, that towards the whole cost of the services above noticed 54 per cent at first and, twenty years later, 64 per cent would have to come from taxation; while as to the narrower field of insurance only 31 per cent at the outset, rising in twenty years to 50 per cent would come from taxation. It was also decided that the scope of S. I. should be extended in two different senses, i.e. the range and amount of benefits provided and the number of people included. The gov.'s scheme as a whole was planned to embrace the entire pop., and the broad principle as to contributions in relation to earnings was that of equal benefits for equal contributions within a specified class or group. Another valuable principle was that the administration of a single comprehensive universal scheme of S. I. must be unified.

The problem of industrial injury insurance, or what has for the past four decades been known as workmen's compensation, was dealt with in Cmd. 6551. In view of the special benefit which the gov. proposed to provide, the industrial injury insurance scheme could not be unified with the general scheme of S. I., but had to be treated as a separate branch of S. I. Broadly the benefits provided under the scheme take the place of the cash benefits payable under the general scheme in cases of disability and of the widow's, orphan's, and guardian's benefits in cases of death. No funeral benefit is payable under this scheme, but is provided by the death grant proposed under the general scheme of S. I. For details of the legislation which implemented S. I. see further under NATIONAL ASSISTANCE ACT (1948); NATIONAL HEALTH SERVICE ACT (1946); NATIONAL INSURANCE ACT (1946); WORKMEN'S COMPENSATION.

A state system of S. I. is practised on varying scales in sev. of the dominions. Canada recognised family allowances as a basic provision of social security with the passage of an act in 1944, introducing payments on behalf of every Canadian child under sixteen (on fulfilment of certain conditions of residence and nationality). In 1949 1,729,150 families were receiving family allowances.

Socialism, political doctrine and movement, which advocates the partial or complete abolition of private property, and the estab. of society upon a basis of the common ownership of some or all of the means of production, distribution, and exchange. It seeks to avoid the crises deemed to be inherent in capitalism by a planned economy, and so to protect the interests of worker and consumer. Springing from the same sources as Communism (q.v.) S. has evolved along different lines, to the point where it is claimed that it offers an alternative to the faults of unrestricted capitalism on the one hand and of Communism on the other.

Criticisms of private property and

the advocacy of common ownership are to be found in some of the Gk. and Rom. thinkers, and amongst the early Christian fathers, but modern S. arises more directly from the eighteenth-century enlightenment and the critics of capitalism. Attacks upon the oppression of the unprotected by the propertied classes are to be found among the works of Mably, Neckor, Rousseau, and others. In the nineteenth century Saint-Simon, Fourier, and Robert Owen (q.v.) contributed their various solutions to the problem of ensuring a better treatment of the industrial proletariat, and Louis Blanc propounded the scheme of planned production with the assistance of state credits and the common ownership of the means of production. Lassalle and Rodbertus put forward similar theories. Much more significant, however, was the teaching of Karl Marx (q.v.) and Friedrich Engels (q.v.). The spread of S. from this point gathered speed, and in 1939 there were thirty-two nations represented on the Labour and Socialist International. Before the First World War the association was known as the International Socialist Bureau. A fundamental cleavage opened between those socialists who wished to achieve S. by peaceful evolutionary methods, usually within an existing framework of parl. democracy, and those, the Communists, who believed that the class-war, culminating in revolution, was the only possible and indeed desirable method. Marxian tactics were exemplified by the Ger. Social-Democratic party, which carried its opposition to the bourgeois parties to the length of refusing to vote for the budget for armaments, and have been further demonstrated in the rise to power of Communist parties in E. Europe, which, though willing to co-operate with opponents for the sake of tactical advantage, never abandoned this fundamental antagonism. In Britain the Social-Democratic party was the representative of the Marxians; the I.L.P. (q.v.) and the Fabian Society representing the evolutionary section. The two latter bodies joined in 1900 with the trade unions to form the Labour Representation Committee (L.R.C.), now called the Labour party (q.v.). In the second half of the nineteenth century the standard of living of the working classes showed a general improvement, a development contrary to the prophecies of Marx. This helped to give a wide measure of acceptance in W. Europe to the ideas of the evolutionary socialists, such as Bernstein, who conceived of the winding-up of capitalism by peaceful reform. Disagreements which existed within the various Internationals also weakened the revolutionary tendency. Ultimately in Soviet Russia was estab. the most complete system of planned economy under a state machine dominated by the Communist party, whilst in W. Europe S. set itself the task of reconciling economic planning with the freedoms generally accepted in a democracy.

In Germany uncompromising Socialists under Liebknecht organised the Spartacists League, which engineered the Ger.

revolution of Nov., 1918, and thereby ended the war. But when, after the war, the Spartacists developed into Communists, they were suppressed by the gov. The schism in S. was made permanent by the formation of the Third International in Moscow in 1920, and in sympathy with the Russian Communists large Communist parties broke away from the Socialists in most European countries, while the moderate elements entered the gov. in many states, concentrating on social legislation and the widening of state influence on economic life. After the First World War moderate Socialists became presidents or premiers in many European countries, among them being Ramsay MacDonald in Britain, Ebert in Germany, Adler in Austria, Stauning in Denmark, and Branting in Sweden. Indeed the growth in numbers and in strength of the Socialist parties in all countries is one of the most marked political phenomena of the early years of this century. In Great Britain the Labour (or Socialist) party formed a Labour Gov. in 1924 for eight months, although without an independent majority, and again in 1929 Labour was returned to office, holding 288 seats (see LABOUR PARTY). But in 1931, during the general election in Nov., the serious condition of Brit. finance, attributed by the opponents of S. to the gov.'s mismanagement, gave rise to a crisis in national affairs, and the pendulum swung violently back, resulting in a drop in the strength of the parl. Labour party until 1915. In most countries the acute economic depression of 1931 resulted in a definite set-back to S.

Attempts which were made subsequently to heal the breach between Socialists and Communists by the Popular Front Movement (a suggestion for political collaboration of Communists, Socialists, and other democratic parties against Fascism put forward by the Communist International in 1935) had no more than a temporary influence in France and Spain. The progress of Fascism in Europe in the period of Ger.-It.-Sp. collaboration indirectly paralysed the policies of the Socialist parties in the democratic countries, for in the hope of thwarting the rise of Fascism they acquiesced in measures which were inconsistent with their principles, and supported Conservative govts. in democratic countries. The effect of the outbreak of the Second World War was greatly to reduce the importance of the Socialist International.

In 1945 the Brit. Labour party won a sweeping victory with 543 seats against the 189 of the Conservatives at the election of that year, and in the Speech from the Throne at the opening of the first session the new gov. under Mr. Attlee (q.v.) included in their legislative programme proposals for nationalising the coal industry, and for bringing the Bank of England under public ownership, and by the end of the year the Bank of England Bill had been passed by the Commons, and the Coal Industry Nationalisation Bill had been introduced. On Nov. 19, Herbert Morrison, Leader of the House of

Commons, announced that during the lifetime of that Parliament the gov. further proposed to bring under public ownership the electricity supply industry, the gas industry, railways, canals, dock and harbour undertakings, and long-distance road haulage services. All this was accomplished and a beginning made with the nationalisation of the steel industry, while it was also proposed to 'mutualise' industrial insurance companies. In Feb. 1950 the Labour party was again returned to office but by a greatly reduced majority, with the result that the gov. temporised on further schemes of nationalisation.

In France since the First World War the Fr. Socialists have been generally numerically inferior in Parliament, but have been the cause of frequent Cabinet downfalls. The first post-1939 election in the Constituent Assembly returned the Communists as the strongest single party, closely followed by the Socialists, and a new political organisation known as the Mouvement Républicain Populaire (q.v.) originally associated with Gen. de Gaulle.

In Belgium in the early 1930s the Socialist party exerted a powerful influence on the political life of the country. It had 79 out of 186 seats in the Upper House, representing 39 per cent of the total votes of the country, and this influence continued after the liberation of the country in 1944-45. In Germany in March 1916 opposition to the fusion of the Social Democratic party with the Communist party in the Russian zone in Berlin was expressed at a conference of the Social Democratic party officials representing Greater Berlin. See also EUROPE, *History*.

In the U.S.A. before the First World War the Socialist vote numbered only about 1,000,000, and only one member was elected to the House of Representatives. Socialist propaganda was severely curtailed during the First World War on account of its hostility to the war, and a large element subsequently moved to the Communist party. But in America neither S. nor Communism has made any headway as a political party, the Labour leaders concentrating rather on working within one or other of the two existing parties. Up to the 1920s the typical employer or manager in the U.S.A. was hostile to organised labour. He fought unions bitterly, with labour spies, terror, and court injunctions. The workers fought back with strikes, boycotts, and sometimes (as among the radical Industrial Workers of the World) with sabotage. Labour in the U.S.A. in the 1890s and 1900s had been very militant, but during the 1920s that militancy waned. Hence membership in trade unions declined, and as late as 1929 there were only 4,000,000 trade unionists out of a labour force of 40,000,000. In 1919 it was some 16,000,000. In the seventies Ger. intellectuals, more acquainted with the tenets of Marx and Lassalle than with Amer. labour, tried to establish an Amer. S., but they met with little success. The Industrial Workers of the World (q.v.), formally organised in 1905, was thoroughly

indigenous, though it borrowed something from the syndicalist teaching of Sorel. Notwithstanding some success in the lumber and mining camps of the W., and in the textile centres of the E., the I.W.W. never had any real numerical strength, and its hostility to Amer. participation in the First World War in 1917-18 put it out of business. See ANARCHISM; INTERNATIONALISM; SYNDICALISM; and RUSSIA, *History*.

Guild Socialism.—An outline of Guild S. is given in G. D. H. Cole's *Guild Socialism* (1920), and the effect of its contribution to Socialist thought in general was acknowledged by Laidler and Ramsay MacDonald. Cole attempted unsuccessfully to persuade the Fabian Society to adopt the principles of Guild S. as its *raison d'être* and formed the Guild Socialist Propaganda Society. Briefly, guildsmen urge the Marxian demands that the wage system should be abolished since it produced a slave state of mind, that the worker should be paid whether employed or unemployed, in sickness and in health; that he should control the organisation of production in co-operation with his fellows, and that he should be assured of a claim upon the product of his work. The guild should be founded upon a democracy, the leaders of the industry concerned to be elected.

See R. Owen, *The Book of the New Moral World*, 1836-42, and *Socialism, or the Rational System of Society*, 1840; H. M. Hyndman, *Historical Basis of Socialism in England*, 1883; J. Ramsay MacDonald, *Socialism and Society* (5th ed.), 1907; *Dictatorship and Revolution*, 1920, and *Socialism, Critical and Constructive*, 1924; Bertrand Russell, *Roads to Freedom: Socialism, Anarchism, and Syndicalism*, 1919; H. Laski, *Karl Marx*, 1924; G. D. H. Cole, *Social Theory*, 1930, and *Fabian Socialism*, 1943; G. B. Shaw, and others, *Fabian Essays in Socialism*, 1931; A. Gray, *The Socialist Tradition: from Moses to Lenin*, 1946; Margaret Cole, *Makers of the Labour Movement*, 1948; *Histoire du Socialisme européen* (ed. from notes on lectures by E. Halévy), 1948; B. de Jouvenal, *Problems of Socialist England*, 1949; F. Williams, *Fifty Years' March of the Labour Party*, 1949; and N. Mackenzie, *Socialism, a Short History*, 1949.

Social Philosophy, that aspect of philosophy that brings the methods of the latter to bear on the ultimate problems of social life and social hist. It is closely related to political philosophy, and was scarcely distinguished from that until the nineteenth century, its recognition as a separate aspect being due to the growing consciousness of society as more comprehensive than the state, which also led to the appearance of sociology (*q.v.*) as a separate study. S. P. is intimately and inextricably linked with general philosophy. A materialist interpretation of the universe implies a materialist interpretation of social life; and similarly with an idealist, a dualist, a spiritual interpretation. The development of S. P., however, follows a significant change in the philosopher's point of view. Much of the

thought of the Renaissance and Reformation periods envisages man as an individual face to face with God or with the universe; and this presupposition is still found in some twentieth-century thinkers. On such a basis the problems of philosophy were individual (thus Descartes's famous 'I think, therefore I am'), and were to be solved by an examination of the implications of individual life in the universe as revealed to the individual. Social philosophers envisage the individual as placed in society and, at least in some degree, conditioned by it, and have considered the implications of the existence and activity of this more complex unit in the universe. As a result, the place and value of the individual in the universe has been radically reconsidered. Biology has had much influence on this, and further emphasis has come from the growing consciousness of the disabilities and problems of a mass civilisation. The philosophic alternatives of sinking the individual in the mass or finding scope and value for the individual in other dimensions have been defined and discussed.

The social nature of ethics, i.e. duty as a social imperative, been the subject of most vigorous discussion, which has ranged from the view that society in imposing duties expresses the will of God on the way of spiritual progress for the universe to the view that duty is just what society decides to decree for purely practical ends. Fresh discussion has also arisen on the question whether a moral purpose can be observed in hist. See also PHILOSOPHY. See bibliography at PHILOSOPHY; also E. J. Urvich, *The Social Good*, 1927; C. Dawson, *Progress and Religion*, 1929; and K. Mannheim, *Ideology and Utopia*, 1936.

Social Psychology, see PSYCHOLOGY.

Social Reform, see under REFORM.

Social Service, term which now embraces much more than almsgiving or 'charity.' The evolution of the S. S. since about 1900 has been so rapid and the changes so radical as to amount to a social revolution. The relief of poverty and distress, either by voluntary societies or by poor law guardians, has given way to a comprehensive system of social security and social insurance (with supplementary assistance in cases of need) which has reached its most complete state of development in the social legislation passed in the United Kingdom after the issue of the 'Beveridge plan' (see BEVERIDGE, BARON, and SOCIAL INSURANCE). In the U.S.A. and many other countries, including New Zealand and other dominions, a similar trend of expansion may be noticed, though there are wide differences of emphasis, direction, and speed. At the same time there has been a shift in the centre of gravity in most countries from the private agencies supported wholly by voluntary contributions to public or statutory authorities financed by the central or local govts. Here again there are different systems, and the position is nowhere static. Broadly speaking, the S. S. may be said to include the relief of poverty, health (personal and environmental, to which may be

added housing and tn. and country planning), education (including the provision of facilities for leisure time occupation for young people and adults), child care, social security, the administration of justice, welfare in industry, and amenity services (e.g. preservation of the countryside). The phrase social services includes in fact any and every aspect of social existence in which the state steps in to improve the standard of living of the citizen.

In Great Britain the social legislation of 1944-49, with its emphasis on the responsibilities of public authorities, introduced no new principle, although it did extend the services to cover a larger number of citizens and to meet a wider variety of needs. Every service now operated by central or local gov. had its origin in the work of private or voluntary agencies. For example, the Ministry of National Insurance, (1946) looks back beyond the first National Health Insurance Act of 1909 to the mutual insurance schemes founded by friendly societies in the nineteenth century. The continued partnership between statutory bodies and voluntary organisations is one of the most significant aspects of Brit. S. S. Even where, as in the health services, the state has taken over full responsibility and in many cases the property and machinery of voluntary organisations, the latter have been invited to continue their association with the particular service, sometimes carrying out statutory functions as agents of the public authority (e.g. home nursing and home 'helps'), sometimes providing an ancillary service which the statutory body is not yet ready to provide entirely (e.g. convalescent homes), but more often carrying out a supplementary function distinct from a state-managed service, such as clubs for elderly folk. So widely accepted is this idea of partnership that central and local gov. bodies frequently give grants-in-aid to voluntary organisations in order to enable the latter to carry out their work. Arising out of the partnership is a growing realisation of the need for closer co-ordination of the voluntary organisations, for the easier exchange of information and views, and the prevention of redundancy of effort. At the national level, this function is carried out by the National Council of S. S., which consists of representatives of over one hundred national voluntary organisations, gov. depts., associations of local gov. authorities, and other bodies. Regionally and locally similar bodies exist in the shape of area and local councils of S. S. and, for the countryside, rural community councils.

U.S.A.—S. S. started later in the U.S.A., but has expanded more rapidly. Up to about 1930 private agencies held most parts of the field, except for education and public health. The New Deal (q.v.) stimulated the extension of the public services, which have taken a slightly different pattern from those in Great Britain owing to the relationship of state and federal authorities. The private agencies are in many cases well endowed

and powerful, and in a number of places have combined for money-raising purposes in 'community chests.' The effect was to intensify the demand for, and supply of, trained workers, whose professional status was earlier and more generally recognised than in England. The expansion of the public services in the 1930s attracted many of these professionals, with the result that there has been perhaps more parallelism and less interdependence between the public and private agencies than in Britain.

Social work has developed from case work (the relief of or care for the underprivileged individual or family) to group work (the encouragement of co-operative activities by groups of persons of like interests), and from these to community organisation. Similarly, it has expanded from the application of palliatives or remedies for social evils to prevention and finally to constructive measures. These trends have led to wider and more comprehensive planning, and it would seem inevitable that in time this will come to embrace both public and private agencies and the social science depts. of univs. at local, state, and national level. See also PIONEER HEALTH CENTRE.

See Beatrice and S. Webb, *Methods of Social Study*, 1932; Constance Braithwaite, *The Voluntary Citizen*, 1938; Sir E. Barker, *Development of Public Service in Western Europe*, 1944; National Council of Social Service, *Public Social Services, Voluntary Social Services*, 1948-49; Lord Beveridge, *Voluntary Action*, 1948; G. D. H. Cole, *British Social Services*, 1949; and H. and M. Wickwar, *Social Services*, 1949.

Social Settlements. The Univ's. Settlement in E. London, widely known as Toynbee Hall (q.v.), was founded in 1884 to be a house of residence for men from Oxford and Cambridge who wished to take part in the life of E. London and to join with their neighbours in working for its betterment. Its example was quickly followed and to-day there are some fifty residential settlements in Great Britain, sev. hundred in the U.S.A., and some in France, Holland, Denmark, and other countries. Their underlying purpose has not altered but its application changes with the passage of time, the growth of new standards, and the particular characteristics of each neighbourhood served. In the last sixty years the wide separation between rich and poor which then existed has been bridged. The old far-flung poverty has largely disappeared, material conditions have vastly improved, the social services, and especially education, have released individual ability which was masked by ignorance and thwarted by lack of opportunity. In these developments S. S. have played a most significant part. To-day some or all of the following is true of most: (1) they are centres of advice and friendship for the people of their neighbourhoods; (2) they provide much informal education through clubs for people of all ages, from the very young to the very old, and in some cases through more formal classes

and study groups in art, music, drama, and social and literary subjects, (3) they enable men and women training for a career in social service or public administration to gain experience of life in such a district which they could hardly obtain by other means and (4) they keep observation on local conditions, note local needs, and work constantly for better standards of life and living and a higher quality of citizenship. Many of the British settlements to-day receive grants from the local authorities in aid of particular branches of work, but all are voluntary institutions, financed mainly from voluntary funds. Both in the management of activities and in their financial users from the neighbourhood are increasingly responsible. The Brit. Association of Residential Settlements (Lynbce Hall 29 Commercial Street London E1) and the National Federation of Settlements 211 1st 53rd Street New York 22 co-ordinate the work of settlements in the two countries. There is also an International Federation of Settlements. See I. D. Ward, *The House in Henry Street* 1915 R. A. Woods and A. J. Kennedy, *The Settlement Horizon* 1922 J. A. R. F. Elliott, *Lynbce Hall* 1936 and Mrs. Stocks, *Fifty Years in Henry Street* 1945.

Société Nationale des Chemins de Fer Français, company formed by a decree of Aug. 31 1937 to amalgamate the former French railway systems of the Paris-Lyon-Méditerranée, Paris-Orléans-Midi, Est and Nord companies and the Alsace-Lorraine and state lines. It was laid down that these should exist as financial entities until 1940, the average date of the expiration of their concessions. They hold 43 per cent of the shares of the national company, these to be distributed amongst their proprietors when dissolution is effected; the state holds the other 51 per cent. Of the administrative council five members are nominated by the companies, five by the railwaymen, and ten by the state. The railway system is divided into six regions or districts, viz. Northern (former Nord), Eastern (former Est and Alsace-Lorraine), South-Eastern (former Paris-Lyon-Méditerranée), South-Western (former Paris-Orléans-Midi), Western (former State) and Mediterranean. In Dec. 1945 the company operated 15,214 steam, 791 electric, and 108 diesel locomotives, 640 railcars, 424 electric coaches, 17,400 carriages, 376,100 wagons and 9,410 luggage vans. Mileage operated is 26,416 of which 2,258 are electrified.

Society for Promoting Christian Knowledge, see CHRISTIAN KNOWLEDGE.

Society for the Propagation of the Gospel in Foreign Parts, **The (S.P.G.)**, was founded in 1701 by royal charter. The president of the society is the archbishop of Canterbury. The headquarters comprise departments for medical missions, women missionaries and candidates, men missionaries and candidates, films and exhibitions, youth education, and editorial. The society works in every continent and now supports forty-four overseas dioceses by block grants from a general fund made to the

bishops. As the servant of the Church the S.P.G. provides for the spiritual, mental, and physical needs of the overseas church, supporting 468 European missionaries, including sixty medical missionaries of all races and aiding forty-three hospitals and twenty dispensaries in India, Burma, Singapore, Africa and China. In 1949 S.P.G. hospitals treated 31,728 in-patients and 514,150 out-patients. The income in 1949 was £325,019.

Society for the Protection of Ancient Buildings, see PROTECTION OF ANCIENT BUILDINGS.

Society Islands, archipelago in the S. Pacific Ocean between 16 and 18 S. 118 and 155° W. just N. of the Fanning Archipelago under French protection. The Is. are divided into two groups. The Leeward Is. were annexed in 1889, and the largest are Huahine (pop. 1230), Raiatea and Tahaa (pop. 4300) and Bora Bora, Maupiti (pop. 1300). The Windward Is. were annexed in 1880 and include Raihiti (600 sq. m., pop. 8600) and Moorea (50 sq. m., pop. 1800). The climate is delightful and the soil fertile. Bananas, sugar, copra, and phosphates are produced. A scientific expedition sent to Raihiti to observe the transit of Venus in 1769 by the Royal Society of London was conveyed in H.M.S. *Indeavour* under the command of James Cook, then a naval lieutenant. Cook named a part of the group of Is. in honour of the Royal Society.

Society of Bookmen, see PUBLISHING.

Society of Friends, see FRIENDS.

Society of Jesus, see JESUITS, III.

Socii, see under ROMAN ARMY.

Socinus, Latinised surname of two celebrated heresiarchs, the founders of Socinianism, which is akin to though not identical with, modern Unitarianism (q.v.). **Jelko Francisco Maria Socini** (**Jeloso Socinus**) (1525-62) was a Roman Catholic lawyer, his father being a jurist. He was keenly interested in theology and in 1516 joined a secret society for the free discussion of theological matters. After having travelled through Europe he finally settled at Zürich where he died. **Lauro Paolo Socini** (**Lausius Socinus**) (1533-1604) nephew of the preceding, had from his youth sympathised with his uncle's views. In 1579 he took up his residence in Poland where feeling was very strong against Unitarian teaching. Here he acquired a very considerable following. Socinianism differs from Arianism in its denial of the existence of Jesus before His birth as a man. It differs from Unitarianism in holding that this birth was miraculous and that Christ was then endowed with certain divine qualities. See L. M. Wilbur, *A History of Unitarian Socinianism*, 1, and its antecedents, 1945, 1946.

Sociology is the name introduced by Comte (1798-1857) and increasingly used for the systematic study of human society. Such study may be purely descriptive, assembling in some agreed order the main or significant facts about some particular society, community, group, or institution, or it may include interpretation of such

facts and abstract generalisations from them.

An approach to studies of a sociological type may be discovered in Gk. thought (e.g. Plato and Aristotle), and medieval philosophers made an indispensable contribution in their theories of the independence of Church and State. It was not till the eighteenth and early nineteenth centuries, however, that the study of society could free itself sufficiently from current dogmatic, political, and ethical presuppositions and attempt to (1760-1825) use scientific methods. In this development Saint-Simon and Comte led the way, the former unsystematically, the latter by constructing a scientific (Positivist) system which however was itself too 'religious' in purpose to be fully effective. Another vital eighteenth-century contribution was made by Vico (1668-1744), whose work had great influence upon the theory of the inescapable impact of the past on present society. Since Comte's day it has been questioned whether S. can properly be called a science.

Most sociologists to-day agree that S. must develop and apply methods in some respects similar to those of natural science, in other respects resembling those necessary in historical studies. With the growth of psychological science has come a recognition that this also has much to contribute, though the substance of its contribution is disputed. Darwin's theories gave a fresh impetus to sociological thought; society could now be conceived as an organism evolving like other organisms. This idea was worked out by Herbert Spencer. As Darwinian thought developed it sometimes tended towards a justification of war and extreme forms of competition. Among those who argued cogently in opposition were Huxley and Kropotkin. While evolutionary theory is now a commonplace in S., more attention is now given to the process of human development as revealed in biology, pre-history, and hist. There is not yet an agreed theory of the origin of civilisation. A contribution of major importance in a closely related field was made from about 1850 by Le Play. Le Play's starting point was reformist: he decided that first-hand investigation was the only way towards discovering a solution to the social problems of W. society. He visited nearly every country in Europe, and made detailed studies of family life with special attention to environmental influences, economic resources, and social status. Le Play's generalisations on types of family life were developed and somewhat over-emphasised by Demolins (1852-1907) and his followers. In Scotland and England, under the influence of Le Play and Demolins, Geddes and Branford (1864-1930) initiated further widespread studies in both rural and city development. This work has been continued by Mumford in the U.S.A. and by the Outlook Tower and Le Play House in England. Towards the end of the nineteenth century the influence of psychology on S. became more obvious. Tarde's work on imitation as a factor in

social life was suggestive, and both Graham Wallas and Hobhouse (1864-1929) gave much attention to the social mind as revealed in contemporary society and in human development. Hobhouse's work has been continued by Ginsberg. Pareto (1848-1923) also worked from a psychological basis; and Derkheim (1858-1917) made an original and influential contribution in his attempt to delimit a specific field for S. combined with an original view of social psychology.

Max Weber (1864-1920) studied relations between religion and economic factors in social life. The work of Karl Marx has been of unrivalled influence, but many W. sociologists do not agree that his conclusions are sound. In England Toynbee (b. 1889) made a monumental study of the causes of the rise and fall of civilisations. In England and even more in the U.S.A. practical needs and the desire to obtain light on the problems of society at first hand have led to the widespread use of the social survey as a method of investigation. Early examples were Rowntree's (b. 1871) studies of York, and Booth's (1840-1916) famous investigation in London.

Perhaps the basic service of S. so far has been the exploration of the general social field, the definition and classification of its various features. Thus the function in society of economic activities, gov., law, custom, mores, tradition, religion, art, science, and language, and the structure and mutual relations of the social groups and institutions responsible for maintaining and developing these, have been defined and studied on a historical basis and in their contemporary setting. Attention has also been given to the various specific forms assumed by human society and by sections of it: the tribe, the nation, the city, the village, the scattered rural society and the community operating within any of these, together with social and economic groupings and associations of all kinds. There is, however, still diversity of opinion among sociologists on the problems of cultural change and social development. Nor does S. speak with any certain voice about the type of civilisation or culture which is most desirable, or most likely to prevail.

See Plato, *Republic* (trans. by F. M. Cornford, 1941); Aristotle, *Politics* (trans. by Sir E. Barker, 1946); A. Comte, *System of Positive Polity* (trans.), 1875-79; H. Spencer, *Sociology*, 1876-98; T. H. Huxley, *Evolution and Ethics*, 1893; C. R. Darwin, *Origin of Species*, 1896; L. T. Hobhouse, *Morals in Evolution*, 1906; C. H. de R. Saint-Simon, *L'Œuvre de Saint-Simon* (ed. by Borghes), 1925; M. Ginsberg, *Sociology*, 1934; F. Le Play, *Family and Society* (ed. by C. C. Zimmerman and M. E. Frampton), 1936; L. Mumford, *The Culture of Cities*, 1938; A. J. Toynbee, *A Study of History* (abridged by D. C. Somervell), 1946; and W. J. H. Spratt, *Sociology*, 1949.

Sooman, see under SOGOM.

Socotra, Sokotra, or Soqatra (ant. Diocoridis Insula), is, in the Indian Ocean, 140 m. N.W. of Cape Guardafui, E.

Africa, and near the entrance to the gulf of Aden. Length E to W, 72 m. greatest breadth 22 m. It is under Brit. protection as a dependency of Aden, the Mahi sultan of Qishn and S. having concluded a treaty with the Brit. Gov. in 1886. The is. is mainly a lofty tableland rising to above 4000 ft. with a narrow coastal plain. This and the valleys are very fertile. Myrrh, frankincense incense, aloes, and butter (ghee) are produced, cattle and goats are reared. The prin. vil. is Hadibu (1 m. inland). Area 1382 sq. m. Pop. 12,000. See H. O. Forbes (ed.) *The Natural History of Soitra and Abd el Kuri* 1903, S. Purchas *Hakluytus Posthumus or Purchas his Pilgrimes* Hakluyt Society ed. (1905-1907) and H. Ingrams *Arabia and the Isles* 1942.

Socrakarta, see SURAKARTTA.

Socrates (c. 470-399 B.C.), Gk. philosopher, b. at Athens of well-to-do parents. Sophroniscus and Phanarete. S. left no writings, so that our information about him depends upon the record of others. S. grew to manhood while Athens was at the height of its glory. About 450 he seems to have become interested in the Ionian philosophy recently introduced into Athens by Anaxagoras, and he attached himself to Archelaus, the latter's successor. It seems that this early interest in physical science led to disillusionment, and S. determined to strike out on his own. In doing so he was undoubtedly influenced by Pythagorean teaching, at any rate by 439 he enjoyed an Hellenic reputation for wisdom. S. is next found serving as an hoplite in the army at Potidaea (430), Delium (424), and Amphipolis (422), where he won renown for his valour and powers of endurance. About 423 S. was burlesqued in the *Comus* of Amipsias and the more celebrated *Clouds* of Aristophanes, and it is certain that the cause of this not always good natured satire was S.'s new aestheticism and novel doctrines about the soul. In 406 S. allowed himself to be elected to the Council of Five Hundred when despite popular clamour he refused to lend his voice to the condemnation of the victorious admirals after Arginusae. Following the expulsion of the thirty tyrants S. was charged with impiety (*asebeia*) and corruption of the youth. The latter indictment amounted to S.'s encouragement of the young to criticize the existing order. He was found guilty by a narrow majority, but by his attitude after the verdict he so enraged his judges that he was sentenced to death. The execution was delayed for thirty days during the Delian festival and during that time S. refused to avail himself of plans for his escape. He drank the hemlock in the spring of 399. The description of his last hours is found in the *Phaedo* of Plato and is among the masterpieces of European literature.

The value of S.'s contribution to philosophy is disputed. Some attribute directly to him much of the doctrine of his disciple Plato, but this view is rejected by most scholars, and indeed S. himself denied that he had any set of positive doctrines to teach. Nevertheless it may

safely be maintained that S. was the founder of the spiritual view of knowledge and conduct. He defined the soul as that in man which has knowledge, and also ignorance good and bad. Thus for the first time intelligence is distinguished from sensation and the soul identified with the normal consciousness or character of man. Moreover S. declared the immortality of the soul. It was but a step from this discovery to the doctrine that goodness is knowledge (*επιστήμη*). The Socratic method of examination in arguments' (*σκέψις ἡ λογική*) or 'Socratic irony' was in



SOCRATES

itself not new, it had already been employed by Zeno against the Pythagorean geometry. What was new was its application by S. to questions of ethics and aesthetics. S. believed that he had a divine mission to convict men of sin (i.e. ignorance) by question and answer, examining systematically the fundamental assumptions from which discuss us of conduct and morality arise, and insisting upon a strict definition of terms. In this method S. may be regarded as the founder of formal logic. See I. D. I. S. H. I. m. H. e. r. k. e. s. c. e. m. v. o. l. i. t. b. e. r. d. e. n. *W. e. r. k. e. d. e. s. S. o. k. r. a. t. e. s. d. e. s. P. h. i. l. o. s. o. p. h. i. e. n.* 1834-1864. E. Zeller *S. o. c. r. a. t. e. s. a. n. d. t. h. e. S. o. c. r. a. t. i. c. S. c. h. o. o. l. s.* (Eng. trans. 1877). I. Bruns *Das literarische Portrait der Sokrates* 1896. J. T. Forbes *Socrates* 1905. J. Burnet, *Plato's Phaedo* 1911. H. Maier *Sokrates, sein Werk und seine geistliche Stellung*, 1914. M. M. Dawson *The Ethics of Socrates* 1925. C. Philipson *The Trial of Socrates* 1928. A. E. Taylor *Socrates* 1935 and Sir R. W. Livingston *Plato's Portrait of Socrates*, an English translation

of the 'Apology', 'Crito,' and 'Phædo' 1938.

Socrates Scholasticus (c 380-c 450), church historian, b in Constantinople while Theodosius the Younger was emperor. His great work was his continuation of the *Ecclesiastical History* of Eusebius, from the beginning of the reign of Constantine (306) to 439.

Soda Water, see MINERAL WATERS

Soddy, Frederick (b 1877), Eng chemist, b at Eastbourne. He was educated at Eastbourne College, the Univ. College of Wales, Merion College, Oxford and also at Montreal under Rutherford and in London under Sir Wm Ramsay. He was demonstrator in chem at McGill Univ (1900-2), lecturer on chem and radioactivity at Glasgow (1904-14), prof of chem. at Aberdeen (1914-19), and prof of inorganic and physical chem at Oxford (1919-36). He was president of the Royal Society (1905-6). His chief field of work was that of radioactivity. In 1912 he elaborated the theory of isotopes, and with Rutherford stated the displacement law of radioactivity. In 1921 he won the Nobel prize for chem. In later life he wrote on monetary problems. His pubs include *The Interpretation of Radium* (1904), *Chemistry of the Radioactive Elements* (1912-11), *Matter and Energy* (1912), *Science and Life* (1920), *Cartesian Economics* (1922), *Money versus Man* (1931), *Interpretation of the Atom* (1932), *Role of Money* (1934), *British Budget* (1938) and *The Arch Enemy of Economic Freedom* (1943).

Söderblom, Nathan (1866-1931), Swedish Protestant theologian, b in Helsingland. After a univ education at Uppsala he was appointed rector of the Swedish church in Paris at the age of twenty-eight. In 1901 he returned to Uppsala as prof. and was made archbishop in 1914 after two years as prof. at Leipzig Univ. He became famous as a writer on historical and theological subjects, particularly by his *The Value of Revelation* (1903), *Origin of Belief* (1911), and his remarkable Luther studies *Humour and Melancholy* (1919). In 1931 he gave the Gifford lectures in Edinburgh pub in 1933 under the title *The Living God*. He was one of the foremost advocates of the unity of the Christian churches. The Lambeth Conference of 1920 gave the recognition which he had sought of special relations between the Swedish Church and the Anglican communion. His next task was to bring about the Ecumenical Church Congress which was held at Stockholm in 1925 with the co-operation of the archbishop of Canterbury. Both Glasgow and Oxford Univs conferred degrees on him. He also did much to try to promote international understanding and the ensuring of peace and for this was awarded the Nobel peace prize for 1930. See lives by P. Katz, 1925, and J. M. van Veen 1950.

Söderhamn, seaport of Sweden, near the mouth of the Ljusne R., 43 m N of Gäfve. There are sawmills and planing works, wood-pulp works and iron works. It has a large timber trade. Pop 11,100.

Södermanland, co of E. Sweden, be-

tween the Baltic coast and Lake Mälaren. Cattle are reared and there are copper and iron mines. The cap is Nyköping. Area 2034 sq m. Pop 210,300.

Sodium (symbol Na, atomic number 11, atomic weight 22.997), one of the alkali metals, occurs abundantly in nature as the chloride. Sodium chloride, or common salt, is found in sea water and some lakes and springs. It is obtained by evaporation of sea water in pans or from the great natural deposits of rock salt found in Chebnie and Stassfurt. As the nitrate, sodium is found in Chile and Peru (Chile saltpetre) and as the fluoride (cryolite), NaF·AlF₃, in Greenland. It is also the constituent of many silicates and is present in animal organisms and in plants. Sodium was first isolated by Davy by the electrolysis of sodium hydroxide. It is manufactured by electrolysis of brine, collecting round the cathode while chlorine is evolved at the anode (see ELECTROCHEMISTRY) which is Davy's original process adapted to modern electrical resources. Sodium is a soft white metal (sp. gr. 0.97) which melts at 97.8°C to a liquid which boils at 784°C, forming purple vapour. Freshly cut sodium has a bright surface but becomes quickly tarnished in air and must be kept in airtight tins or under rock oil. Heated in air the metal turns to form sodium peroxide and sodium monoxide and when heated in hydrogen forms the hydride NaH. It rapidly decomposes water with the formation of the hydroxide and the evolution of hydrogen ($2\text{Na} + 2\text{H}_2\text{O} = 2\text{NaOH} + \text{H}_2$). Thrown on to water it runs about as a silvery globule and it is lighter than water. The globule is surrounded by the evolved hydrogen which does not catch fire unless the water is limited in quantity. It then burns with a yellow flame due to the presence of sodium vapour. Sodium is used either alone or in the form of the mercury amalgam or as a reducing agent for organic compounds and is also employed in the preparation of the peroxide and cyanide. Sodium forms two oxides viz the monoxide and the peroxide. The monoxide (Na_2O) is a white amorphous compound produced by the partial oxidation of the metal in a limited supply of air or excess of the metal being distilled in vacuo. An alternative method is to heat sodium with sodium hydroxide. Sodium monoxide reacts thus with water: $\text{Na}_2\text{O} + \text{H}_2\text{O} = 2\text{NaOH}$. Sodium peroxide (Na_2O_2) is a yellowish white solid obtained by heating the metal in air in aluminium vessels. It decomposes water and forms sodium hydroxide. Oxygen is also evolved, and on account of this property the peroxide is used as an oxidising agent. With hydrochloric acid, the peroxide forms hydrogen peroxide which is used for bleaching. It is a useful reagent in qualitative work. Sodium hydroxide is produced when sodium or its oxides are brought into contact with water. It is manufactured by the electrolysis of brine, collecting round the cathode while chlorine is evolved at the anode (see ELECTROCHEMISTRY). Caustic soda, a white

solid, readily dissolves in water with great evolution of heat, and is used in the manufacture of soap and for the production of mercerised silk. Sodium chloride is the most important halogen compound of the metal and is obtained by the evaporation of sea water or from salt beds. It is the main source of the metal and of chlorine, as an article of food it is of great importance (see SALT). Sodium nitrate or Chile saltpetre (NaNO_3) occurs in the crude state ('caliche') in Peru and Bolivia. It was formerly largely employed for the manufacture of nitric acid and is of great importance as a fertiliser. Much sodium nitrate is now obtained from synthetic nitric acid and the importance of the S. Amer. beds has greatly diminished. Heated strongly it evolves oxygen and is converted into the nitrite which is used for preparing artificial organic colouring matters. Sodium sulphate is prepared in the salt cake process for alkali (q.v.). It is used in medicine as a purgative. Sodium sulphite, prepared by the action of sulphur dioxide on sodium carbonate, is used as a preservative in photographic developers. Sodium thiosulphate ($\text{Na}_2\text{S}_2\text{O}_3$, often known as 'hypo' sulphite of sodium) is prepared by boiling sodium sulphite with fumes of sulphur. It dissolves in water with absorption of heat and is largely employed in photography as it dissolves the unaltered halogen salts of silver from the film after development but does not affect the image. The most important of the artificially prepared compounds of sodium is the carbonate, commonly known as soda (Na_2CO_3), and its manufacture is an important industry. The process first adopted in the manufacture was the Leblanc or black ash process. This was superseded by the Solvay or ammonium soda process. For the Leblanc and Solvay processes and the uses of 'soda' see ALKALI. Sodium cyanide is made on the technical scale from coal gas (q.v.) and by pouring fused sodamide, NaNH_2 , on to hot charcoal, $\text{NaNH}_2 + \text{C} \rightarrow \text{NaCN} + \text{H}_2$. It is used for the extraction of gold (q.v.).

Sodium Metaborate, see BORAX.

Sodium Sulphate, or **Glauber's Salt** ($\text{Na}_2\text{SO}_4 \cdot 10\text{H}_2\text{O}$), is prepared by heating salt with sulphuric acid and crystallising the residue from water from which it separates as colourless prisms having ten molecules of water of crystallisation which are lost on prolonged exposure to the air. S. S. has a cooling, bitter and salty taste, is a mild laxative and diuretic, and is present in the waters of Carlsbad, Cheltenham, etc.

Sodom, see ADAM or SODOM.

Sodom and Gomorrah, two of the five cities of the plain which lay at the S. end of the Dead Sea. Near Sodom Lot took up his residence, but was driven thence before the destruction of the cities recounted in GEN. xix. 21 ff. The region is bituminous, and such regions are liable to sudden eruptions.

Sodor and Man, see MAN, 1411 or

Soekarno, Achmed (b. 1901), see INDONESIA and JAVA, *History during and after the Second World War*.

Soerabaya, see SURABAYA.

Soest, 1. Tn. of Westphalia, Germany, 34 m. S.E. of Munster. In the Middle Ages it was an important member of the Hanseatic League. It is a railway junction and manufactures footwear and iron and electrical goods. Pop. 23,100. 2. Corn in the prov. and 9 m. N.E. of Utrecht, Netherlands. Pop. 5200.

Sotula, seaport in Mozambique (Portuguese I. Africa) on the south side of the Buzi delta. It is an unimportant settlement on a silting harbour, with little to recall its earlier prosperity. In 1505 Albuquerque overcame the Arab inhab. and placed the first settlement here. In 1942 Portugal took over the ter. of Manica and S. which was incorporated as a prov. of the colony of Mozambique, with Beira as its cap. The new prov. comprises the dists. of Beira and Tete. Pop. (1940) 20,000.

Sofia, 1. City of Bulgaria lying in the W. and bordering on Yugoslavia. Area 6002 sq. m. Pop. 1,200,000. 2. Cap. of Bulgaria. It is traversed by six streams, trib. to the Isker and lies on a pt. in the foot of the Vitosha Range, 1400 ft. above the sea, 50 m. W.N.W. of Plovdivopolis. It is on the main railway lin. to Istanbul. A modern city with spacious boulevards, a large theatre (opened in 1906) and handsome public structures has replaced the squallid Turkish city of 1870. It has a modern cathedral dedicated to St. Alex. under Nevski and here is the state univ. There are mineral springs with a temp. of 117° F. Skins, maize, silk, grain and other articles are exported. Pop. 400,000.

Soft Hail, see under SNOW.

Soft-shells, or **Softs**, see BARNACLES.

Soft Soap, see under SOAP.

Sogdiana, see SAMARKAND.

Sogdian Language, see under INDIC LANGUAGES.

Sognefjord, inlet running eastward from the S. coast of the W. coast of Norway. It is the longest (about 100 m.) and also the deepest in the country. There are no obstacles for the first 50 m. from the sea, but after that the fjords of Hjørlands, Sognefjells, Aurlands, Lardals and Aurlands are thrown off in various directions. The fjord is popular with tourists because of its magnificent panoramas of scenery.

Sogn-og-Fjordane, co. of Norway formerly N. Bergenhus, bordering on the Atlantic and including Sognefjord. The cap. is Lækkanger. Area 7155 sq. m. Pop. 95,000.

Soham, par. in Cambridgeshire. 1 ng. land 6 m. E. of Ely. St. Andrew's church is partly of twelfth century construction, there is a grammar school founded in 1647. It has orchards and market gardening. Pop. 5000.

Soignies (Ilem Zinnik), tn. in the prov. of Namur, Belgium, 10 m. N.N.E. of Mons. It has important quarries of freestone and limestone. The church of Saint Vincent is one of the oldest and most remarkable examples of the Romanesque architecture of the country. The forest of S., which lies S.E. of Brussels and covers about 16 sq. m. is only a remnant of the once vast and splendid forest of this name. Pop. 10,300.

Soil, or Mould, natural medium on the earth's surface in which plants grow. True S contain five types of constituents: a mineral matrix derived from rocks disintegrated by weathering forces; organic matter from the decomposition of plants and animals; a population of micro organisms, water, and air. Most S are formed from parent rocks broken to tiny particles by agents such as heat and cold which cause fragmentation by expansion and contraction, water which in freezing increases 9 per cent in volume to exert tremendous pressure in rock and soil masses and which has a solvent and eroding action in movement wind which transports soil particles and erodes rock masses plants which cause mechanical and chemical reactions and chemical changes such as oxidation carbonation, etc. In the reactions of mineral rock to water and air. Glaciers grind down the hardest rocks and have been instrumental in forming many S. Geologically S fall into two classes: sedimentary and transported. Sedentary S are residual old and with a mineral matrix similar to the rocks beneath them and are usually of fine particles clay and silt predominating. Part the result of organic remains accumulating in shallow basins is a special form of sedimentary S termed cumuloose. Most S consist of materials transported by water ice or wind. Water gives alluvial S formed by rivers and marine S originally formed on a sea bed. Ice gives glacial S usually stratified and wind aeolian S typified by deserts. Mineral particles by proportion and size determine texture and characteristics of a S. They range from finest clay through silt and sands to coarse sand and gravel. Clays are termed heavy stiff sticky and cold sandy S light open and warm S containing various particles in good balance are termed loams (q_1). Incorporation of organic matter leads to formation of humus the foundation of S fertility. Presence of suitable base calcium or lime (q_1) increases micro organic and earthworm activity. Together, humus and lime improve soil structure opening up clays binding sands, by causing crumbling and assure a better balance of moisture and air in the S, so enhancing fertility. A profile of a S down to parent material reveals its mineral formation but fertility is greatest at and near the surface. Cultivation is therefore confined to the top soil and immediate sub soil. See also DRY FARMING, FARMING LOAM, SOIL EROSION. See N. M. Comber *In Introduction to the Scientific Study of the Soil* 1948. J. J. Russell *Soil Conditions and Plant Growth* 1949 and A. D. Hall *The Soil* 1919 also, Commonwealth Agric. Bureau *Bibliography of Soil Science Fertilisers and General Agronomy* 1940.

Soil Erosion. Erosion in nature is the beneficent process by which soils are formed from the parent rock and by which the topography of the earth is shaped. But the same process accelerated by human intervention and mismanagement has become one of the most destructive forces

that have ever been released by man. What is known as 'geological erosion' or denudation by rivers glaciers frost, and so on (see DENUDATION) is a universal phenomenon which through thousands of years has moulded the earth into its present contours. But the delicate adjustment or equilibrium between soil formation and denudation or between the protective shield of vegetation and its environment is easily disturbed by the activities of man for it reverses the order of plant succession and this man made S E is occurring to day in almost every country inhabited by civilised man except W. Europe. The soils of W. Europe have not eroded in spite of being subjected to the most intensive cultivation in history because the system of cultivation evolved in that continent over many centuries has enormously enhanced soil fertility. Europe in fact owes its immunity from S E to the adaptation of its agriculture to its climate.

The culdest stage of erosion is loss of fertility. The most significant physical deterioration in consequence of cultivation is a reduction in the porosity and cohesion of the soil. Rainwater that previously was absorbed by the soil then runs off the surface carrying soil with it and sheet erosion begins. This is one of the three chief types of erosion the others being gully and wind erosion. The most dangerous and prevalent is sheet erosion the primary cause of which is cultivation of land on slopes without the use of terraces or other preventive measures and this form of erosion takes place to a greater or lesser extent on all slopes when the soil is left exposed and heavy storms are experienced. Gully erosion occurs when no vegetation is left to arrest the flow of storm water which then finds its way downhill in a series of rills whose channels are widened and deepened with every fresh downpour and almost any channel or track may develop into a gully. Gullies are among the more spectacular results of erosion and but for them the far more sinister insidious and widely destructive processes of sheet erosion might remain unnoticed for much longer. For sheet erosion reveals no serious external symptoms until it is so far advanced that only a complicated and costly treatment can effect a hazardous cure. Gully erosion which if unchecked can result in incalculable havoc is the direct consequence of and can only be controlled by preventing sheet erosion. Both sheet and gully erosion are due to the action of water. Frost may however result from the action of wind alone. The predisposing conditions of wind erosion are an absence of vegetal covering for the soil combined with a low fertility level causing the soil to become pulverised a dry period and broad open treeless plains where no obstructions break the force of the wind. The wind lifts the pulverised soil bodily from the surface the atmosphere is choked with dust and sand man and beast are stifled crops are uprooted and the whole countryside lies stripped as if a hurricane had passed over it. The

tremendous dust storms which have swept the Amer. prairies in recent years and darkened the sky over the Atlantic cities and far out to sea were not the caprices of nature, for sixty years ago fierce winds that accompanied these dust storms have passed harmlessly over the grass covered prairies. But the activities of pioneering man moving his frontier ever farther westward and cutting down tree and bush on his march have led to the loss through these dust storms of millions of ac. of the topsoils of the great plains. In Africa where S. L. in the last two decades has

of the mt. ranges where gullies and floods lay waste great areas though denudation there is due also to the abuse of grass lands by over grazing. The large forest reserves in the hills are the chief protection for the flow of rivers and irrigation but a number of large forest areas have been allowed to relapse into wild possession with serious consequences. Overstocking is equally a factor in S. L. in Africa. In this connection it is to be remarked that African run forests after cutting and burning are converted into savanna and this in its turn is reduced by further burning to mere



U. S. Information Service American Embassy

SOIL EROSION

Uncontrolled running water has slashed the side of this hill on a farm in the the Norris Dam Reservoir area of the Tennessee Valley Authority until the ground is useless for either cultivation or grazing

become increasingly recognised as one of the chief problems demanding the attention of the govts. and people of nearly all African states, dust storms have not yet developed on a great scale, though wind erosion is a factor of growing seriousness. S. L. in fact presents a problem in many continents and countries. India, China, Ceylon, Japan, and Australia as well as the U. S. A. and Africa. S. L. has a direct relation with the decline of past civilisations and it is probably true to say that great empires and civilisations of the past have been literally swept out of existence by S. L. e. g. in Iraq owing to the silting up of the ancient irrigation works. China and India afford the most obvious examples of man made desolation, the loess soil of the great river basins of China being an extremely erodible soil. S. L. in India is most threatening in the foothills

of the mt. ranges where gullies and floods lay waste great areas though denudation there is due also to the abuse of grass lands by over grazing. The large forest reserves in the hills are the chief protection for the flow of rivers and irrigation but a number of large forest areas have been allowed to relapse into wild possession with serious consequences. Overstocking is equally a factor in S. L. in Africa. In this connection it is to be remarked that African run forests after cutting and burning are converted into savanna and this in its turn is reduced by further burning to mere

lush covered veldt. Overstocking and constant grazing and trampling by cattle convert this veldt to desert thus reaching the point when S. L. through water and wind becomes disastrous. The rapid development of commercial tea and rubber plantations in Ceylon has had deleterious effects on the soil. Erosion is widespread in the island and in some areas is very far advanced. It is therefore not surprising that Ceylon was one of the first Britishers to realise the significance of S. L. by setting up a committee of investigation (1929), though preventive measures were deferred pending the results of propaganda and education. Tea plantations are now accustomed to put a conservation value on woods, although the position is not quite as simple in the case of rubber plantations. On most rubber estates in Ceylon protection cannot be

guaranteed merely by regulating the vegetation and terracing is also necessary. Japan also provides a case in which the mischief of S. E. was not only early realised, but firmly checked. There, however, erosion does not prevail to any great extent, as the Jap. learnt how to control it by a national policy of keeping the watersheds under forest in order to defend the valleys from floods.

The U.S.A. affords an example both of extensive research into the problems of S. E. and very comprehensive state action to check the damage revealed by investigation. 'Colouration' in the U.S.A. is responsible for the destruction of half the forest land, while overstocking led to the denuding of grazing land as in Africa. It is estimated that one-third of the total area under crops is in an advanced state of erosion, and the security of another third menaced; while the situation in grazing land is hardly less serious. The most remarkable examples of erosion in the U.S.A. are to be found in the region between the Mississippi and the Rocky Mts., known as the 'Great Plains,' which has been converted by the plough from the original buffalo range into the present 'dust bowl.' Wind erosion carried the topsoil away in dense dust storms from great areas that should never have been ploughed. But vigorous, if costly, measures have for many years been adopted to cope with the problem on a nation-wide scale. The S. E. Service set up in 1933 was later enlarged into the Soil Conservation Service with an ann. vote of about \$35,000,000. Under the Soil Conservation Act of 1936 farmers are subsidised for withdrawing land from certain soil-depleting crops and substituting soil-conserving crops or pasture. This Act has had an appreciable effect in combating S. E. and exhaustion. The idea of conservation, to save America from the consequences of its too rapid exploitation, is not new, but apart from spasmodic attempts by far-sighted individuals, it was President Theodore Roosevelt who first aroused the people to its nation-wide importance, and during his term of office attention was given mainly to plans for conserving mineral, forest, and water resources. During Franklin Roosevelt's presidency conservation became a political and social question of the first importance, a plank in the platforms of both the Republican and Democratic parties. Over forty states have separate land-planning agencies, but the sanctity of state rights has not seldom proved an obstacle to the adoption of regional conservation schemes. In marked contrast to those agencies is the Tennessee Valley Authority (*q.v.*), whose *raison d'être* is the reclamation and stabilisation of the badly eroded and destitute natural region formed by the Tennessee R. drainage basin, the area of the region comprising parts of seven different states. The desert is beginning to fructify once more in the Tennessee valley, where man and nature are proving a stronger combination than man and money.

The actual extent of erosion damage in Australia and New Zealand is much less

than in the U.S.A., though it is said that further investigation will show the extent to be much greater in Australia than is generally realised. Serious wind erosion has occurred in the semi-arid pastoral belt where the states border upon the central arid 'desert' region. According to scientific opinion the settlement of certain regions such as the Otway forest region was carried out too hastily. Erosion in many parts of the Murray R. watershed is causing uneasiness, the trouble being due mainly to the burning of pastures in the catchment area, which kills the grass, impoverishes the land, and encourages the growth of useless scrub. Regulations for stopping cultivation or burning near water courses have been in operation for many years.

S. E. has many secondary results, of which the most important are the silting up of dams and reservoirs, the escape of much of the rainfall before it can be utilised by plants, and the drying up of rivers. See also IRRIGATION; ORGANIC FUSBANDRY. See A. J. W. Hornby, *Denudation and Soil Erosion in Nyasaland* (Nyasaland Dept. of Agriculture Bulletin 11), 1934; R. M. Gornie, *The Use and Misuse of Land*, 1935; *Journal of Association of Chinese and American Engineers* (vol. xvii., No. 4), 1936; Q. C. Ayres, *Soil Erosion and its Control*, 1936; Sir F. Stockdale, 'Soil Erosion in the Colonial Empire,' *Empire Journal of Experimental Agriculture* (vol. v., No. 20), 1937; U.S. Dept. of Agriculture, Technical Bulletin, No. 578, 1937; House of Representatives Document, No. 144, seventy-fifth Congress, 1937; Lord Hailey, *An African Survey*, 1938; G. V. Jacks and R. O. Whyte, *Erosion and Soil Conservation*, 1938, and *The Rape of the Earth: a World Survey of Soil Erosion*, 1939; Lord Northbourne, *Look to the Land*, 1940; A. L. Dudley Stamp, *The Land of Britain: its Use and Misuse*, 1918; P. J. O. Trist, *Land Reclamation*, 1918; F. Osborn, *Our Plundered Planet*, 1919; F. H. King, *Farmers of Forty Centuries*, 1919; and H. A. Temperley, *The Practice of Soil Conservation in the British Colonial Empire*, 1949.

Soilless Culture, see HYDROPONICS.

Soils, Calcareous, see CALCAREOUS.

Soissons (Rom. Augusta Suessionum), tn in the dept. of Aisne, France, on the Aisne, 65 m. N.E. of Paris by rail. The cathedral of Notre-Dame dates back to the twelfth century. There is trade in agric. produce, and there are iron- and copper-smelting works and manufs. of metal goods. It saw much fighting in 1914 and 1918. In the Second World War it was liberated by Patton's (*q.v.*) Third Amer. Army on Aug. 29, 1944. Pop. 18,200.

Soko (O.E. *soc*), word signifying jurisdiction, and especially the privilege of holding a court. It is thus used in Domesday Book. By extension it came to be used to describe the area under a particular jurisdiction; the word survives in the 'soko of Peterborough.'

Sokolovsky, Vassili Danilovich (b. 1897), Russian soldier, b. in St. Petersburg (Leningrad). He was a lieutenant-general

in 1940, and in the Second World War commanded the Russian forces in the Vyasma area in the spring and summer of 1942, and in the fighting of March 1943. In Sept. 1943 Smolensk, for long Hitler's headquarters on the E. front, was taken by storm by S. He was chief of staff to the First Ukrainian Army under Marshal Konev (g.v.) which swept through S. Poland in Jan. 1945, and crossed the Oder in the same month. S. was promoted to marshal after the war in Europe. In 1946 he was made military governor and commander-in-chief of the Soviet zone of Germany, and Russian representative on the Allied Control Commission. In 1949 S. was succeeded by Army-Gen. V. I. Chukov.

Sokoto, native prov. in the N.W. corner of the Brit. Protectorate of N. Nigeria, formerly an independent state. The prov. is watered by the Rima or S., which joins the Niger at Gomba, and by other affluents of the Niger. Extensive areas are occupied by rocks of Tertiary age; gold in lode formation has been discovered at Bin Yauri and Mallele. The prov. is fertile, especially with orchard bush, in the south; but the N. part merges into the sandy conditions of the Sahara. Average rainfall is under 25 in. The rearing of cattle, almost exclusively owned by the Fulani, is the chief activity, and there is an important trade in hides and skins. Crops for domestic consumption are guinea corn, millet, and rice; crops for export are ground-nuts and some cotton. The city of S. (pop. 20,000), stands on an affluent of the Rima. The prov. is inhabited by Hausa-speaking tribes, all more or less of negroid type.

After the *jihad* or holy war of 1508 Othman dan Fodio, a famous Fulani chief, was proclaimed Sarkin Musulmi or commander of the Faithful. On his death in 1817 Bello, his son, was recognised as commander of the Faithful. Bello's reign was a stormy one, being occupied with warfare against the tribes which refused to submit to Fulani rule, and it was only towards the end of his life that he finally consolidated his great dominions. He died in 1837, and was succeeded by his brother Abubakar Atiku, in whose family and his own the sultanate of S. has continued carrying with it the title of Sarkin Musulmi. Lt. Clapperton, the explorer, visited Bello in 1824 and 1826, and took a friendly letter from Bello to the king of England. Joseph Thomson travelled there in 1885, and there concluded treaties on behalf of the Royal Niger Company. In 1890 a declaration was signed with France mutually recognising the respective spheres of influence of France and the Royal Niger Company, France agreeing that the company's sphere extended to all that fairly belonged to the kingdom of S. Later the company ceded its rights to the Crown, though it was not until 1903 that S. came under Brit. control. In the meantime Sir Frederick Lugard (see LUGARD, LORD), the high commissioner, had announced the inauguration of the N. Nigerian Protectorate, but the sultan of S. treated the announcement

with contempt, and made a show of armed resistance. Fanatics charged the Brit., but this was ineffective and a few days later most of the S. chiefs made their submission to the high commissioner, and were asked to nominate a successor to the sultan who had fled. They chose Atahiru, the terms of his nomination being the abolition of slave raiding, and the recognition of Brit. suzerainty, coupled, on the Brit. side, with the assurance that the Mohammedan religion would not be interfered with. Later there was a somewhat serious rising at Satoru, headed by the son of a chief who had proclaimed himself the mahdi. A company of Brit. mounted infantry were sent up, and the sultan's garrison at S. was heavily defeated, but on March 10 the rebels were annihilated. Area 35,100 sq. m. Pop. (1931 census) 1,869,000 (S. div. 1,369,000. Gwandu div. 393,000; Argungu div. 107,000). See *Handbook of Nigeria*, 1936, and Sir A. C. Burns, *History of Nigeria*, 1945.

Sokotra, see SOCOTRA.

Sola, see SHOLA.

Solam, vil. of Palestine the O.T. Shunem (2 Kings iv. 8-37), 7 m. S. by E. of Nazareth.

Solana, see under MEDITERRANEAN SEA.

Solanaceae, family of dicotyledonous plants, contains about 1500 species in tropical and temperate lands. These may be herbs, shrubs, or trees, and the leaves are usually alternate and exstipulate. The flowers are generally in cymes or are solitary; they are hermaphrodite; both calyx and corolla consist of five joined parts; there are five epipetalous stamens, two united and superior carpels forming a bilocular ovary containing from one to many ovules in each loculus; the fruit is a berry or a capsule. Many species are of great economic importance, and some of the chief genera are *Capsicum*, *Solanum* (potato and tomato), *Datura*, and *Nicotiana* (tobacco). Poisonous species are common. *Atropa belladonna* is the deadly nightshade, yielding the drug atropine; *Hyoscyamus* is henbane, and contains hyoscyamine.

Solan Goose, see GANNET.

Solanum, chief genus of Solanaceae, consists of nearly 1000 species, natives of tropical and temperate lands. It contains such well-known plants as the potato (*S. tuberosum*), the nightshade or bittersweet (*S. Dulcamara*), and the egg-plant (*S. melongena*); *S. lycopersicum*, or *Lycopersicon esculentum*, is the tomato.

Solar Constant, the name given to the quantity of heat which would be received per minute on a square centimetre (5 in. x 5 in.) exposed perpendicularly to the sun's rays if there were no atmosphere (Dyson). This quantity is measured by an instrument called a pyrheliometer, which is so constructed that, while shielded from receiving heat in all other ways, it retains nearly all the heat from the sun. The amount of heat is measured in calories, and while this amount fluctuates slightly, the value 1.93 is close to the actual figures. This means that in 1 min. the heat of the sun, under the conditions described above, would raise 1 gramme of

water through 193°C or 1.93 grammes through 1°C

Solar Engines During the siege of Syracuse 214 B.C. Archimedes is said to have burnt the Roman fleet by concentrating the rays of the sun on the ships by means of mirrors. The possibility of such a feat was tested by Buffon 1747 who succeeded in setting fire to wood at a distance of 64 metres by means of 360 plane mirrors mounted in a frame. At 6 metres he melted silver with 117 mirrors. In 1755 Hoesen of Dresden constructed parabolic mirrors with one of which 15 metres in diameter Wolf melted coins almost instantly. De Saussure (1740-99) constructed 'hot boxes' made of half cubes of glass fitting one within the other with air spaces between. The sides and back were wrapped in non conducting material and the vessel rested on a blackened non conducting table. He thus obtained a temp of 110°C in the central box and by warming the surrounding to a

maximum pressure recorded correspond to a temp of about 145°C

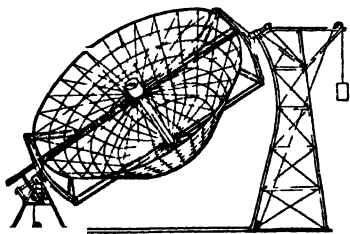
One of the most recent developments is the solar furnace at Meudon observatory, near Paris. The laboratory, on the Meudon plateau, is about 30 metres above the level of the Seine and the sky is relatively free from dust. The mirrors used are 2 metres in diameter and only 85 centimetres in focal length. One of these lies on two perpendicular axes and is so directed that its axis of revolution passes through the centre of the sun and a plane mirror of 30 to 40 centimetres diameter intercepts the beam reflected from the parabolic mirror. The most refractory oxides and a number of mixtures of two of these oxides have been brought to the melting point with the apparatus which is described in *Research a Journal of Science and its Applications* vol 1 No 1 June 1945. It is pointed out that for industrial purposes the use of plane mirrors for directing and concentrating solar radiation represents the essentials of what should render feasible the construction of large furnaces. Such furnaces would make possible an immense variety of operations.

Solar 'Flares', see under PROMINENCES

Solar Notation see under NOTATION

Solar System has for its dominant body the sun. Round this body revolve the planets, asteroids, comets and meteors as well as the satellites to the planets. The members of the system in addition to the sun, are Mercury, Venus, the Earth, Mars, the asteroids, Jupiter, Saturn, Uranus, Neptune and Pluto (see table at PLANETS) for the distances of the planets see BODIES, J 1. The motions of bodies round the sun are generally anticlockwise looking on the ecliptic from the N. as also the rotation of the body on its own axis. The orbits are elliptical and of varying eccentricities and their planes are only slightly inclined to the ecliptic except in the cases of some of the asteroids. Pluto a number of satellites and many of the comets. The revolving bodies are not truly spherical but flattened at the poles and are at very different temps, i.e. in 4 stages of cooling. Comets are members of the S.S. as also certain swarms of meteors, in these cases the orbits vary enormously both in eccentricity and inclination. In spite of the enormous size of the S.S. the whole forms a mere speck in the universe, the sun being merely a star its planets invisible from any other star. The invariable plane, or plane of maximum moment of momentum was determined by Lagrange, it lies at an angle of $1^{\circ}55'$ to the ecliptic and between the orbital planes of Jupiter and Saturn. The whole system is moving towards a point near the edge of the constellation Hercules having a right ascension of about 271° , and a declination of about 31° , according to Wilson, Campbell and Moore.

The most recent theory of the origin of the planets has been developed by Dr R. A. Lyttleton who has collaborated with Mr I. Hovell both Cambridge mathematicians and astronomers. Briefly, this theory postulates that the sun had once a very massive star as its companion,



SOLAR ENGINE

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temp just less than that recorded in order to prevent escape of heat. A temp of 160°C Sir J. Herschel, carrying out experiments at the Cape (1834-38) with a similar type of box obtained a temp of 240°F and cooked meat and vegetables. From 1860 to 1880 A. Mouchot of Louvain constructed parabolic mirrors of large size installed in Algeria for pumping water. By a similar machine M. Pifre 1882 printed the *Soleil Journal* by solar energy. Ericsson of America drove a 24 h.p. engine by similar means. The Lincoln solar engine 1901 was used in California and Arizona. The concentrator frame carries mirrors and the lower end remains open. The boiler is placed at the focus of the rays. It consists of a steam and water drum, a settling chamber for impurities, copper tubes connecting the upper and lower chambers so that water fills in an inner and rises in an outer one. These are enclosed in glass tubes which admit solar rays but retard escape. With engines of this description a steam pressure up to 150 lb. per sq. in. was obtained, steam condensed 144.5 lb. between 11 a.m. and 12 noon. In a day 146,780 gallons were lifted (plus friction) 39.4 ft. Dr Abbot calculates that about 72 per cent of solar radiation is turned into heat and steam, and that 70 per cent is attainable. The

and that this star underwent a series of explosions which drove off a considerable amount of its material in a gaseous form. The wisp of gas finally settled down into a flat circular disk that rotated around the sun and from this the planets were formed. The theory is still *sub judice* and comments on it would be premature at present. Dr. Lyttleton has also dealt with the origin of comets; his theory postulates a process of development quite different from that of the planets. For earlier theories about the formation of the S S see NEBULAR HYPOTHESIS.

Soldan, Mariano Felipe Paz, see PAZ SOLDAN.

Solder and Soldering. Soldering a process of joining metals, falls into two types: soft and hard. Hard solders are usually included in the brazing range (see below).

Soft Soldering is a process of joining two pieces of metal by the use of low melting point alloys, i.e. lead tin and lead tin cadmium, fusible between 200° C. and 350° C. The general rules to be observed for soft soldering are: (1) thorough cleaning of the metal parts to be joined, which is done in various ways, e.g. by the use of emery cloth, glass paper or by pickling in solution; (2) the application of a flux which must be of a nature to prevent oxidation of the surfaces to be joined during the process of soldering (and at the same time to dissolve such oxides as may already exist there). Flux is usually a compound known as zinc chloride made by dissolving zinc in hydrochloric acid. Most common metals and their alloys can be joined with solder, the method differing according to the size and character of the parts to be joined.

One method is by the use of a soldering iron, a tool best described as a copper tip riveted to an iron shank and fitted with a handle. Before the iron is used it is cleaned and heated and then dipped into a flux. Solder is then held against the heated tip of the iron so as to flow around and completely coat it, a process known as tinning. The metal parts to be joined are then thoroughly cleaned by means of one of the methods already described and placed together, where possible with edges lapped. Flux is then applied to the edges with a brush. The iron is now reheated to a temp. sufficient to heat the edges of the joint and to melt the solder. The filler stick of solder is then held to the tip of the iron and together they are drawn along the joint, the molten solder and heated edges thus uniting to form a tight seal.

A second method is by the use of a blow lamp, this method being used where positioning of work makes it difficult for a soldering iron to be used. The blow lamp flame is usually a combination of paraffin and air, or alcohol and air. The flame is played upon the surfaces to be joined and a soldering rod applied to the heated surfaces which themselves melt the solder. Excess solder is removed by wiping off before solidification. Flux is used also in this type of jointing.

A third method called *wiping*, is used for lead pipe and lead cable joints, and calls for skill and practice. The solder is heated in a ladle to a semi molten condition and poured over the joint to be made. It is then pressed against and around the joint with a specially prepared pad impregnated with tallow (the flux for this type of joint). The solder mass is manipulated until the joint has reached a sweating temp. denoting proper contact of solder with the joint. When this temp. and contact is obtained, the pasty solder is shaped and rounded with the wiping pad until the joint hardens and subsequently cools.

Hard Soldering or Brazing.—The term brazing is usually applied to a process for joining metals with alloys of copper and zinc (spelter solder), silver solders, brass and nickel silver and copper alloys. The methods of heating vary, the most common being by blow pipe and forge. The temps. required for brazing cause oxidising and this is eliminated by the smearing or melting of a flux (usually a combination of borax and boric acid) on the joints, dissolving any surface oxides and protecting against oxidation during the brazing. The parts to be joined are first thoroughly cleaned and set closely together, the flux is applied to the joints in paste form either before they are heated or in some cases, by dipping the filler rod or brazing alloy into powdered flux and applying after the joints are heated to a brazing temp. In the case of blow pipe heating the flame of the blow pipe is played upon the parts to be joined until a brazing temp., varying between 600° C. and 1100° C. according to the alloy used is reached, at which point the brazing rod is applied to the heated edges and allowed to melt with and fill the joint.

Where forge brazing is used the parts to be joined are placed in a forge which is heated to brazing temp., the flux and filler rod are then applied to the joint in a similar manner to that of the blow pipe technique. In either case the joint must be allowed to cool until the brazing alloy is solidified. Flux residue is removed by scrubbing the surface of the joint with a wire brush and hot water.

Soldier Beetle, or *Leptophorus* genus of carnivorous beetles a number of species of which occur chiefly in meadows in Britain. **Soldier-bird**, or *Myzomela sanguinea* Indian species of the honeycater family Meliphagidae. It occurs in Australia and its plumage is of brilliant scarlet and black.

Soldiers' Graves, see GRAVES.

Soldiers', Sailors', and Airmen's Families Association, founded in 1885 by Col. Sir James Gideon. The S S A F A has since been in continuous existence through peace and war looking after the families of service and ex-service men and women and helping them in their difficulties. Originally its work was confined to making charitable grants to the needy but with changing times and improved social legislation the S S A F A's work for service families now covers the whole field of welfare in its widest sense. It deals with

some 300,000 cases a year. The association is supported by voluntary contributions, and has some 15,000 voluntary workers operating from 1500 branches throughout the country. The head office is at 23 Queen Anne's Gate, Westminster, S.W.1.

Sole, flat fish belonging to the family Pleuronectidae, and constituting the genus *Solea*. The best-known species is *S. vulgaris*, the common S. which occurs in many parts of Europe. It attains a length of from 10 to 20 in. and is the most highly valued of all food fishes. Other species are *S. lascaris*, the lemon S., *S. minuta*, the little S., and *S. variegata*, the banded S. The Amer. S. or hog-choker belongs to an allied genus, and is known as *Achirus fasciatus*.

Sole Bay, Battle of, see **SOUTHWOID**.

Solenhofen Stone, limestone which is quarried mainly at Solenhofen, near Munich, as a lithographic stone. Owing to its excessively fine grain, it has preserved excellent fossil remains.

Solenoid, see **ELICTRICITY** AND **MAGNETISM**, *Magnetic Effects of a current*.

Solent, The, W. part of the strait between the Isle of Wight and the coast of Hampshire, England, 17 m. long by 1 to 5 in. wide, and famous for its yacht racing.

Solennes, in the dept. of Sarthe, France, famous for its abbey. S. is the head of the Fr. Benedictine congregation, and is well known for its liturgical movement and its reform of the Gregorian plainsong (q.v.) Pop. 700.

Soleure (Ger. Solothurn): 1. Canton in N.W. Switzerland, stretching from Basle to Berne and crossed by the Jura. There are shoe, paper, cement, textile, watch, and iron industries. Agriculture, forestry, and cattle-rearing are also carried on. Area 300 sq. m. Pop. 154,900, mainly Ger.-speaking Rom. Catholics. 2. (Ant. Salodurum), cap. of the above, on the Aar, 20 m. N.E. of Berne. It is an important railway junction, and watch-making and quarrying are carried on. Pop. 15,400.

Solfatara (Fr. soufrière, Ger. Schwefelgrube or Schwefelsee), It. name for dormant volcanoes which only exhale gases. The most notable are found in Italy, the Antilles, in the interior of Asia, and in Java. The S. of Pozzuoli, near Naples, is an irregular plain, 1363 ft. long and 1310 ft. broad.

Sol-fa, Tonic, see **SOLMISATION**.

Solfeggio, type of vocal exercise derived from the hexa chord of Guido d'Arezzo, the notes of the octave C to B reading upwards being expressed by the syllables *Ut* or *Do*, *Re*, *Mi*, *Fa*, *Sol*, *La*, and (added later) *Si* or *Te* (see **SOLMISATION**).

Solerino, vil. in the prov., and 20 m. N.W. of Mantua, Italy. Here the Fr. and Habsburgians under Napoleon III. defeated the Austrians on June 24, 1859.

Solicitor, Brit. term for a member of the lower branch of the legal profession. The old name for an Eng. S. was 'attorney', a term which probably grew into disfavour because used so often as a term of reproach or contempt. Blackstone himself spoke of them 'in a tone of haughty disparagement,' though they were a powerful class

of the community and numbered, in 1863, some 10,000 persons. At the date of the Solicitors Act, 1843, the 'junior profession' of the law (the members of which are now termed 'solicitors of the Supreme Court') comprised two distinct branches: (a) attorneys and (b) ss., though originally the term attorney covered every legal agent who was not a barrister. The term attorney, later, was confined to persons who were formally appointed to prosecute and defend actions in the common law courts, whilst the term S. was applied to those who solicited or took care of suits, bills, and petitions in the equity courts, before Parliament, the Privy Council, etc., or conducted private negotiations and arrangements not involving or arising out of litigation. The Solicitors Act of 1843 was passed at the instance of the Incorporated Law Society, and its provisions prohibited any person from practising as an attorney or S. unless admitted and enrolled and otherwise duly qualified to act as such. After 1943 the term S. gradually superseded the term attorney, most S. being admitted in the courts of common law as attorneys, 'attorney' became obsolete at the passing of the Judicature Act, 1873. The Act of 1960 was passed to amend the Acts relating to attorneys, S., proctors (q.v.), and certificated conveyancers, and allowed certain persons, graduates, bona fide clerks to attorneys, and others to be admitted as S. after three years' service. In the Solicitors Act, 1877 provision was made for qualifying examinations and the issue of certificates by the Incorporated Law Society.

Under the consolidating Act of 1932 (repealing over thirty statutes passed since 1839) any person who has obtained from the Law Society a certificate of having passed the final examination provided by the Act, may apply to the master of the rolls to be admitted as a S. Women became eligible as S. in 1919. Service under articles, as well as passing of examinations are conditions precedent to admission. The term of service as an articled clerk varies from three to five years according to circumstances and standard of education. Provisions as to length of articles, fees, examinations, and the like are dealt with in the Solicitors' Act, 1936. A disciplinary committee of the Law Society, appointed by the lord chancellor, deals with matters of professional conduct. The committee may suspend the S. from practice or remove his name from the roll after hearing sworn evidence, and its finding is enforceable like a judgment or high court order, but an appeal lies to the high court. (This statutory jurisdiction is distinct from the supreme jurisdiction of the high court over S. who are officers of the court; for the court can take cognizance of neglect or misconduct as a S. and of acts morally disgraceful even though there is no professional misconduct.) Every S. must take out an ann. practising certificate; otherwise he is an 'unqualified person' and guilty of an offence and liable to penalties. The Law Society as the registrar of S. has

a discretion to issue a certificate unconditionally or with conditions or to refuse the application. A S who wilfully and knowingly acts as agent for unqualified persons in any action or in any matter in bankruptcy will be struck off the roll and imprisoned. Similarly no S can employ any person who has been struck off the roll or suspended from practice without the consent of the Law Society. Under the Solicitors Act 1941 the Law Society maintains a compensation fund to enable them to make grants in their discretion in suitable cases for the purpose of relieving or mitigating losses sustained by any person in consequence of dishonesty on the part of a S or his clerk or servant. Contributions to the fund are found by an annual levy of £5 on all Ss payable on the issue of their practising certificates. A S is bound to exercise skill and diligence in the conduct of the business on which he is employed by his client but though he is liable for the consequences of ignorance or non observance of the rules of practice of the court and for want of ordinary care in the conduct of a cause, he is not answerable for error of judgment upon points of new occurrence or of doubtful construction. In such cases if he takes counsel, which he will in general, be protected, but not upon a point of which it is the S's duty to be master. Under the Solicitors Act 1933 the council of the Law Society must make rules as to the opening and keeping by S of accounts at banks for clients' moneys and as to the keeping by S of accounts containing particulars of moneys received held or paid by them on account of their clients. (See the Solicitors' Accounts Rules, 1945 made under the Act.) See also *FEES Legal Fees*. See A Cordery *Law Relating to Solicitors* (4th ed.) 1935. H. G. Lemmon *How to Become a Solicitor* 1946 and *Annual Practice of the Supreme Court*.

Solicitor-General, law officer of the Crown next below the attorney general and his deputy. The appointment of S G is a political appointment but the dominant party generally chooses the foremost men at the Bar a discretion the more to be observed in that the posts of S-G and attorney general give by a convention of the constitution or at all events a well recognised custom an immediate revision to the dignity of the lord chief justice. The salary of the S G is £7000 a year with fees but he may not engage in private practice. He is included in the commission of the peace for every co or co div and represents the Crown in prosecutions of unusual importance. Until recently the acceptance of office of S G necessitated re-election except in the case of the S G taking the place of the attorney general on the latter's elevation, death, or for any other reason. But now he does not have to seek re-election. There are S Gs for Scotland, and for Australia, Canada, and other parts of the Commonwealth.

Solidago, see **GOLDEN ROD**

Solid Injection, see **INTERNAL COMBUSTION ENGINE**

Solids, geometrically, as distinguished from points, lines, and surfaces, are characterised by extension in three dimensions, and are bounded by surfaces, they occupy space and are measured by volume. Physically S differ from gases (g v) and liquids (l v) in that they possess a definite shape and have a definite volume. When the molecules of a substance are in a state of aggregation such that the distances between the molecules are relatively large, then the molecular attractions have a negligible influence on the motions of the molecules. This is typical of the gaseous state. The molecules of a liquid while subject to the attractive forces of their neighbours are still sufficiently free to be able to wander fortuitously from one point to another. The molecules of a solid however, are so closely packed that the attractive forces exerted on an individual molecule by its immediate neighbours are so great that the molecule has very little freedom of movement and it remains 'attached' to its neighbours. The great elasticity of S is due to this characteristic of the solid state i.e. it is difficult to deform a solid and it has the property of easily recovering its original shape after the deforming stress is removed. Definiteness of shape, density and volume of a solid are similarly explained by the molecular aggregation peculiar to this state. The ultra-microscopic character of S has been revealed by X-ray analysis initiated by Bragg who has shown that the different properties of S as regards their hardness, tenacity, ductility, malleability etc. are due to the states of aggregation of the molecules peculiar to each substance during the process of solidification. Beginning with the X-ray analysis of S that exhibit the property of solidifying to form large crystals, Bragg discovered the precise arrangement of the molecules within the crystal. Later he revealed the molecular arrangement of S such as metals whose crystals are so minute that they present an amorphous constitution to the naked eye. See Sir W. H. Bragg *Concerning the Nature of Things* 1935 and W. I. Bragg, *Atomic Structure of Minerals* 1937.

Solid, Surface, Line, and Point, see GEOMETRY

Solidus, Roman gold coin, the value of which was fixed by Constantine the Great in 312 at 72 gr. Troy and it remained until 1453. The S was the source of medieval coins. It was divided into thirds (*truncus*), and whilst the gold *truncus* was the standard gold coin of W. Europe until the eighth century it was copied in silver by the barbarians, and thus became the A S pennyweight. The name S survives in French.

Soliman, see **SOLYMAN**

Solimena, Francesco, called l'Abate Ciccio (1657-1747), Neapolitan painter, b. at Canale di Serino, shared with his friend, Luca Giordano, the highest reputation among contemporary artists and died a wealthy man. His frescoes in San Paolo Maggiore, his 'Last Supper' at Assisi, and some of his classical pictures are much admired. See study by P. Capobianco, 1936.

Solingen, tn. in N. Rhine-Westphalia, Germany, on the Wupper, 12 m. S.E. of Düsseldorf. Its trade is chiefly in connection with the iron and steel industries, cutlery being predominant. Its steel was well known in the Middle Ages, being used for sword blades. S. was heavily bombed during the 1939-45 War, being an important armaments centre. Pop. 133,000.

Solitaire, or *Pezophaps solitarius*, extinct flightless bird of the dodo family, Dididae. It seems to have been peculiar to the is. of Rodriguez in the Indian Ocean, and was described by the exiled François Leguat in 1708. In height the male was about 2½ ft. and in weight about 45 lb.; the legs were longer and the bill smaller than those of the dodo.

Solitaire, game played by one person with a board and marbles, the object being to remove the latter from hollows in the former, by 'jumping,' as in draughts, in such a sequence that the last marble is left in the central hollow. Also the Amer. name for patience.

Solitary Confinement, see under PRISONS.

Sollum, small port and gulf in the extreme W. of Egypt. During the First World War it was a base for Brit. operations against the Senusid tribesmen. It changed hands sev. times during the Second World War. See AFRICA, NORTH, SECOND WORLD WAR, CAMPAIGNS IN.

Solmisation, chiefly represented to-day by tonic sol-fa, is the system of singing notes to syllables instead of to words. Although an analogous idea seems to have been known to the Gks., the modern method was introduced during the eleventh century, probably by Guido d'Arezzo (see SOLFEGGIO). At that time the hexachord system had superseded the Gk. tetrachords, and the syllables *ut, re, mi, fa, sol, la*, the first in successive lines of a hymn to John the Baptist, composed about 770, which began each line one note higher than the previous line, were applied to the notes of the natural hexachord C D E F G A, the hard hexachord G A B C D E, and the soft hexachord F G A B♭ C D. A kind of modulation called mutation was employed where a melody exceeded the compass of one hexachord, *ut* being sung instead of *fa* or *sol* when changing from the natural to the soft or hard hexachord respectively. This system was later extended to correspond with the octachord, by the addition of a syllable *si* for the diatonic seventh, and *ut* was replaced by *do*; both changes were derived from the method of S. known as boccellisation, advanced by Waelrant (c. 1518-95), who proposed the use of the syllables *do, ce, di, na, lo, ma, ni*. The application of numerals to notes, suggested by P. Galin (d. 1821), improved by Aimé Paris (d. 1866), and perfected by Émile Chevê (d. 1861), was in principle the same as the Eng. system of tonic sol-fa.

There are two chief systems of S. at present: (i.) fixed *do*, and (ii.) the movable *do* method of tonic sol-fa. The fixed *do* system regards C as *do* in whatever key it occurs. Although excellent for absolute pitch, this method is weak where, for instance, remote modulations occur in quick

succession. Further, in a key well removed from C major, the intervals are incorrect. Another theoretical objection is that, as with the black keys of a piano, C♯ and D♭, D♯ and E♭, and so on, are necessarily regarded as identical. No satisfactory method of naming these

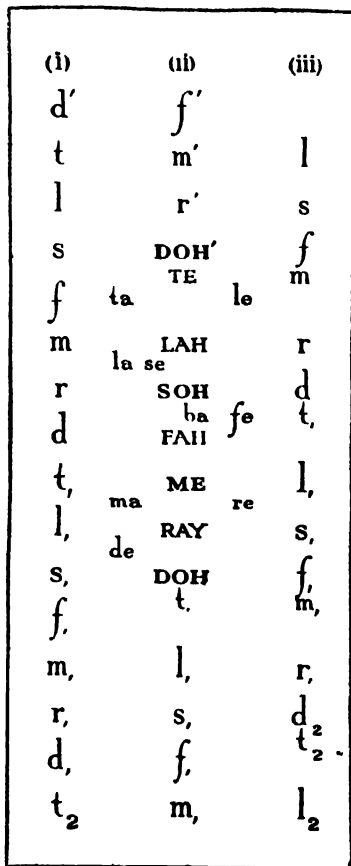


DIAGRAM 1

accidentals has yet been devised, although in a pamphlet pub. anonymously at Venice in 1746 the syllables *pa, bo, tu, de, no* were suggested, and more elaborate schemes have since been advanced. The movable *do* is far preferable, as formulated in the tonic sol-fa system, drafted by Sarah Glover (d. 1867), with anglicised spellings of S. syllables, but estab. and perfected by John Curwen (d. 1880), who opened a tonic sol-fa college in 1863. His method corresponds to the equal tempera-

ment principle and is easily assimilated. The appended diagram (1) shows its principle as embodied in the 'Modulator' or tutorial chart. The syllables are expressed in their *ling* equivalents. Modulations are effected by moving horizontally from one column to another, e.g. from *soh* (column 1) to *r* (column 2) or to *d* (column 3) if the key changes to subdominant or dominant respectively. Minor scales are regarded as variants of the relative not tonic major; this practice is justified by the use in ordinary staff notation of the same key signature for both. Passages are written out horizontally and divided vertically by lines, colon stops, and commas (',' and ',') into bars, beats, and divisions of beats (see Diagram 2).

Solo, piece of music for one performer instrumental or vocal generally with an accompaniment for a second performer or

Rumschisky of the renowned Leschetizsky school, and then in Paris. He embarked on concert work by giving a recital at the Wigmore Hall in 1921, since when he has given recitals throughout Britain as well as on the Continent. During the Second World War he undertook extensive recital tours for the forces, notably in Egypt, Palestine, N. Africa, Malta and Europe.

Solomon Islands, archipelago of Melanesia, in the W. Pacific stretching from N.W. to S.E. for some 600 m. between 5° and 11° S. and 154° 40' and 162° 30' E. The archipelago consists of seven large is., Bougainville (which falls within the administrative area of Australian New Guinea), Choiseul, Yasibil and Malaita (the N. chain) and Guadalcanal, New Georgia and San Cristoval (the southern chain), together with a number of smaller



DIAGRAM 2

group of performers. **Solo** part in a concerto for 15 performers with orchestra is called the 15 part.

Solo, Bengawan, or Sambaya, riv. of Java rising in the S. mt. chain. It follows a winding course to the strait of Madura and has a length of 310 m.

Solozub, Fedor (pseudonym of Fedor Kuzmich Teterukov) (1863-1927) Russian poet and novelist, b. in St. Petersburg. He was educated to be a schoolmaster but abandoned this profession when he established his reputation as a novelist with *The Little Demon* (1907). He was a follower of Blok and his poems belong to the Symbolist school.

Solola, cap. of the dept. of S. in Guatemala. It rises some 2000 ft. above Lake Atitlán (17 m. in length) and is 48 m. W.N.W. of Guatemala City. Besides coffee plantations, there are minims. of pottery, coarse cloth and soap. Pop. 15,000.

Solomon, third king of Israel, son and successor of David, reigned over the kingdom of ancient Israel from about 970 B.C. to 931 B.C. For S. place in hist. see ISRAEL. S. has been accepted as a symbol of wisdom, pomp, and magnificence. The age of S. was certainly one of the most flourishing periods of material civilisation in the hist. of Palestine. Archaeology has corroborated biblical tradition in no uncertain way. His name is of frequent occurrence in Mohammedan literature (e.g. in the *Thousand and One Nights*). See I. Thibberger, *King Solomon* 1947.

Solomon, professional name of Solomon Galtner (b. 1902) Brit. pianist of Jewish descent, b. in London. He first appeared in public at the age of eight, playing a Mozart concerto at the Queen's Hall and made his first tour of Eng. cities at the age of nine, playing with all the leading Brit. orchestras, under Nikisch, Harty, Wengertner, and others. At fourteen he retired for five years' study first under

is, including Fulzti, the cap. of the Brit. protectorate which comprises all the excepting Bougainville and Buka. The is. are of volcanic origin and the coral reefs are only an adjunct to mt. masses which rise to a height of 9000 ft. They have been little explored and still less economically developed. They are picturesque with primeval forests of slender palms, coral gardens showing the translucent sea bottom, tiny coral islets everywhere, and lovely lagoons. Stone urns adorned with strange reliefs seem to indicate the existence of a genuine Melanesian culture. The climate is unhealthy, malaria, frambesia, and other tropical diseases are prevalent. N.W. and S.E. monsoons prevail, torrential rain and storms of freakish violence sweep the group, and the scattered is. are subject to earthquakes.

The natives are extremely primitive and it is not so long ago that they were head hunters like the natives of New Guinea. Between them the missions and the gov. have done much to draw the islanders from their feuds to more useful pursuits. Coco planting for copra is the chief industry. Copra, pearl-shell, trochus-shell, ivory nuts, sandal wood, gold and tortoise-shell are exported.

The first known European to visit the S. I. was a Spaniard, Alvaro de Mendana, who set out on a voyage of discovery in 1568. The is. were not rediscovered until 1767 when Capt. Cook found the Santa Cruz group and Malaita and Bougainville sighted some of the is. in 1768. Mendana named them 'the Isles of Solomon', to the end that the Spaniards, supposing them to be those isles whence Solomon fetched gold to adorn the Temple of Jerusalem, might be the more desirous to go and inhabit the same.

It was partly Australia's fear of German power in the Pacific and partly the desire to ensure a civilized gov. and to maintain

order, that led to the estab. of a Brit. protectorate over the southern group by treaty with Germany in 1893, the Brit. sphere of influence being previously recognised in 1886. Many other is. were added to the protectorate in 1898-99, including the Santa Cruz group, Rennell, and Bellona; and in 1900 Choiseul, Ysabel, and some is. in the Bougainville Straits were transferred by convention from Germany to Great Britain. After the S. I. became a Brit. protectorate, law and order were estab. and native headmen were appointed to help in the administration of justice. The N. Solomons (Bougainville, Buka, and other is.) were captured from Germany by Australia in 1914, and mandated to Australia after the First World War. The total area of the S. I. is 11,500 sq. m. Pop. (estimated 1947) 94,800. Europeans numbered under 200, the natives, Melanesian and Polynesian, comprised the bulk.

In the Second World War Jap. forces landed in the N. Solomons on Jan. 22, 1942. On Aug. 7 an Amer. amphibious force launched a counter-offensive against the south S. I. and estab. positions on Tulagi, Guadalcanal, and Malaita. By the spring of 1943 the Jap. had two divs. of troops in the N. Solomon Is., operations being directed from Rabaul, but the Amers. were solidly estab. on Guadalcanal and on Feb. 9th, 1943, the Jap. withdrew their troops. In the same year fresh landings in the S. I. were followed by the conquest of the New Georgia group in the central Solomons. The last Jap. garrison to hold out was that on Bougainville, where the Amers. handed over the task of subjection to the Australians. See further under PACIFIC CAMPAIGNS OR FAR EASTERN FRONT IN SECOND WORLD WAR.

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Solomon, The Wisdom of, trans. of the Gk. title Σοφία Σολωμωτος and Lat. *Sapientia Salomonis*, in the Lat. Vulgate it appears as *Liber Sapientie*, 'Book of Wisdom.' It is one of the apocryphal books (see APOCRYPHA) of the O.T., but is included in the Rom. Catholic canon. It purports to be the work of S., who is not

actually named in the book, but he is manifestly the speaker in chaps. vi-ix., for he is the builder of the temple in Jerusalem in ix. 7, 8. The W. of S. is an exhortation to seek wisdom, first, because it brings salvation to the pious Jews; secondly, because of its divine essence; and thirdly, because the hist. of Israel shows how wisdom brought blessings to Israel and calamities to the heathen. It is generally believed that the W. of S. was written originally in Gk., by an Alexandrian Jew with a philosophical education, its most probable date is 100-50 B.C. Some scholars consider it as the most beautiful of all late Jewish writings.

Solomon's Seal, name applied to various species of the liliaceous genus *Polygonatum*. The plants have rhizomes on which a mark resembling a seal remains as each ann. shoot dies down.

Solomos, Dionysios (1709-1857), Gk. national poet, b. on the is. of Zante, used the vernacular dialect of the Ionian Is. His *Ode to Liberty* was as famous as that of Shelley, and he wrote the Gk. national anthem. His poetry is full of fire and inspiration.

Solon (c. 638-c. 558 B.C.), Athenian law-giver. He early distinguished himself by his poetry, his first works being in a light and amatory vein, later giving way to poems offering wise advice. S. quickly made an impression by his equity and wisdom. Accordingly in 594 B.C. he was chosen archon in the hope that he would end the internal dissensions caused by the rivalries of the three parties, known by their place of habitation as the Plain, Upland, and Shore. The aristocrats dwelt on the plain, the merchants along the shore, and the poor people on the highlands. S.'s efforts to fulfil this hope were embodied in his code, comprising constitutional, economic, and miscellaneous reforms. By dividing the citizens into classes according to their landed property, he was able to establish what was his ideal *politeia*, namely, a limited oligarchy. As regards the *βουλή*, or deliberative council of 400, S. reorganised, if he did not institute it, and it was he, probably, who entrusted to the august Areopagus the guardianship of the laws and morals of the community. The disburdening ordinance, or *εὐσέφεια*, was the most famous of his economic measures; it sought to relieve the debtors with as little infringement as possible on the claims of the wealthy creditors, and seems to have consisted principally in a depreciation of the coinage. He visited Egypt, Cyprus, and possibly Lydia. Old quarrels were revived during his absence, and shortly after his arrival at Athens the power was seized by Peisistratus, to whom S. is said to have given advice on various later occasions. See K. Freeman, *The Work and Life of Solon*, 1928, and W. J. Woodhouse, *Solon the Liberator: a Study of the Agrarian Problem in Attica in the Seventh Century*, 1938.

Solothurn, see SOLOTHURN.

Solovetsk, group of is. at the entrance to the gulf of Onega, in the White Sea. On the main is., called S., is a monastery,

founded in 1429 to which formerly 10,000 pilgrims travelled annually.

Soloviev, Vladimir Seigevich (1853-1900), Russian philosopher and poet b in Moscow. Partly by the study of philosophy and partly by personal religious intuition, he abandoned his early atheistic materialism and accepted Christianity, believing the ideal essence of the world existed in the mind of God and naming this essence 'Sophia', conceived of as a feminine entity, of whom he experienced three visions. He revived the Christian humanism of such thinkers as Erasmus More, and de Sales supplied a theological and philosophical justification for it and urged that the principle of holiness should be introduced into every sphere of man's social life. He believed that the reconciliation of the E and W churches was of supreme importance for Europe and sought for a synthesis of the two. His work is of the greatest importance in the movement for the reunion of the churches. Many of the ideas of such writers as Péguy, Maurin and Berdyaev are fore-shadowed in his writing. Long titles of his works include *Justification of the Good* (1918), *Plato* (1915) and *The Great Dispute and Christian Policy*. See lives and studies by D. von Cramadé 1909. H. Prager, 1925, G. Sacker, 1929. W. Szylkowski (2nd ed.) 1937. K. Grossmann 1936 and F. Mucklmann 1916.

Solo Whist, card game normally played by four players with the full pack of fifty-two cards. It is also a good game for five, each player in turn standing out for one deal. The game as played by four is here described as in ordinary whist (*q.v.*) tricks are to be made. A bare majority of tricks counts for nothing, the object is to make either (a) eight tricks with a partner (*proposition*) or (b) five (*solo*) or nine (*abundance*) tricks from one's own hand against the remaining three players in combination or (c) so to play one's own hand as to make no tricks at all (*misère*). Each hand constitutes a separate game. Partnerships change round after round while *misère* is a special call. The cards are dealt three at a time down to the last four which are then dealt singly, the last four turned up as the trump in the dealer's hand. The player on the dealer's left has the first call. A player if he does not pass can either (1) *propose* which of course involves asking for a partner or (2) call *à la* or (3) call *simple misère* the trump suit being discarded or (4) call *simple abundance* naming his own trump suit if he plays before the first call is led, or (5) call *open misère* (*misère ouverte*) i.e. undertake not only to lose all thirteen tricks but to show his own cards immediately the first trick is played or (6) call *abundance déclare* i.e. undertake to win all thirteen tricks choosing his own trump suit. The value of these different calls is in the inverse order to that in which they are stated. An *abundance* in trumps is superior to an *abundance* in a plain suit. If the first player elects to 'pass', he and he only, may accept a proposition made by any of the remaining players provided such propositions have not been previously

accepted or superseded by a higher call. An inferior call is necessarily of no avail if a previous player has made a better one. If the dealer, when it comes to his turn to call *propose* (assuming there be no better call by a previous player), only the player on his immediate left may accept. A player who makes the highest call, viz. *abundance déclare* leads wherever he may be seated in relation to the dealer. A player having once made a call may not use it to any superior call. If all the players pass, the cards are dealt anew by the second player unless it has been previously arranged in such an event to play general *misère* when the player who takes the thirteenth trick pays some agreed stake to the other players. Stakes are proportioned to the value of the call. Where in *abundance* proposition, or *solo* succeeds with tricks to spare (over tricks) these are paid for according to a previously arranged scale. Conversely, under tricks i.e. those short of the number required are paid for by the player failing to fulfil his call. If a card is exposed by one of two opponents of a *misère* caller, or a card led out of turn against him or a revoke is made, the *misère* caller can claim the stakes.

In the case of other exposures the aggrieved player can demand that the exposed card be played or not played and this as long as the card remains unplayed. But the offender can always throw away the exposed card if he cannot follow suit, or he can lead it except against a *solo* or *abundance*. The penalty of cutting a suit is enacted when a player leads out of his turn. In this case if the other players do not choose to regard the card so led as exposed they may call a suit from the offender or his partner when it comes to the turn of either of these next to lead and this demand must be complied with under penalty of a revoke. The penalty for a revoke is the loss of three tricks. If the offender succeeds notwithstanding the subtraction of three tricks in making enough to win his declaration, he loses the declaration and pays into the stakes the agreed price of his call to each of his adversaries (or if he have a partner the two pay the penalty jointly). If both sides or all the players revoke the deal is null and void.

In *solo* for three one complete suit is removed leaving a pack of thirty-nine cards dealt out (in threes) in the ordinary way. The order of calls is *solo* *abundance* *abundance* in trumps *misère* *abundance déclare* and *misère ouverte*.

S. W. differs from contract bridge in that there is no universally accepted code of rules. See A. S. Wilks, *Solo Whist and Auch à Solo*, 1923.

Solstice, points in the ecliptic at which the sun is farthest north and south from the equator. The former is the summer S. (about June 21) and the latter the winter S. (about Dec. 23) and on these days the sun enters the signs of Cancer and Capricornus respectively. The summer S. coincides with the longest day and the winter S. with the shortest.

Soluble Glass, or **Water Glass**, is prepared

by fusing silica (sand or flint) with sodium carbonate, or with carbon and sodium sulphate, when the silicates of sodium may be dissolved out. It may be also prepared by digestion of silica and caustic soda under pressure. It is thus obtained as a viscous solution from which concentrated acids precipitate the hydroxide, dilute acids with weak solutions retain the silicic acid in solution but the mass gradually gelatinises and then solidifies. SiO_2 is used for preparing artificial stone, and is coated on buildings as a protection against weathering for the manufacture of soap for preserving eggs, and for fireproof cements.

Solutions, homogeneous mixtures of two or more substances the composition of which can be continuously varied between certain limits. Matter is in three distinct states of aggregation—solid, liquid, and gas, and since matter in any state can be mixed with matter in every other state at least theoretically, the following different classes of S are possible viz S of (1) gas in gas (2) liquid in gas (3) solid in gas (4) gas in liquid (5) liquid in liquid (6) solid in liquid (7) gas in solid (8) liquid in solid (9) solid in solid (10) more complicated S with the three stages of aggregation represented. Essentially then the study of S consists in the study of such classes of mixtures. When different substances are brought together they either act chemically on one another or they simply mix. It is this latter class only where no chemical action takes place that constitutes true S . In terms of the phase rule (see GIBBS, JOSHUA WILLARD) a solution is a single phase.

Solutions in Gases.—When one gas dissolves in another to form a true solution it is soluble to an unlimited extent. The pressure exerted by a mixture of gases is the sum of the pressures of the constituents. This law of partial pressures enunciated by Dalton is strictly applicable only to perfect gases. Liquids have the power to dissolve in gases or as we more generally say, a liquid can vaporise into a space containing a gas. A phenomenon of this type is ordinary evaporation in the presence of the atmosphere. The law of the S of a liquid in a gas was discovered by Dalton and states that the vapour pressure of the vapour of a liquid in the presence of a gas is the same as in a vacuum. Some solids such as iodine pass over into vapour in the presence of a gas, without first becoming liquid thus forming S of solids in gases. The solubility of solids in gases increases with rise in temp, i.e. the vapour tension increases with rise of temp.

Solutions in Solids. Many solids have the property of dissolving gases e.g. palladium dissolves hydrogen and charcoal dissolves carbon dioxide. The greater the pressure to which the gas is subjected the larger the quantity absorbed by the solid. It is often a matter of extreme difficulty to differentiate between true solution and chemical combination in such cases. S of liquids in solids are known, but their properties have not been studied to any extent. Mixed crystals and glasses

form types of S of solids in solids. These S show some of the properties of gaseous and liquid S . Diffusion of a solid through a solid has been demonstrated by clamping disks of gold to the base of lead cylinders, and keeping at a constant temp for four years. On assaying the lead it was found that the gold had diffused about 8 millimetres into the lead. The law of Henry (see below) holds for solid S and is in the case of liquids where the vapour tension of the S is less than that of the solvent, so in solid S there is a diminution of the maximum tension of the solvent. In the study of alloys (g) solid S are frequently encountered.

Solutions in Liquid. All gases are absorbed to some extent by all liquids the amount absorbed varying with the nature of the gas and of the liquid. Thus ammonia is very soluble in water 1 volume of water at 0°C and 760 mm pressure dissolving 10.0 volumes of the gas whilst under the same conditions only 0.02 volume of hydrogen is dissolved. The solubility of gases in liquids diminishes with rise of temp. With only slightly soluble gases such as nitrogen the law of Henry holds. This states that the amount dissolved at a given temp is directly proportional to the pressure but since the density of a gas varies directly with the pressure the volume of gas dissolved is therefore independent of the pressure. In the case of mixed gases dissolving in a liquid Dalton's law of partial pressures holds, i.e. the solubility of each gas depends on its own partial pressure. For high pressures and for very soluble gases (and therefore for concentrated S) Henry's and Dalton's laws do not hold. S of liquids in liquids can be divided into two classes: (1) liquids which are miscible in all proportions (2) liquids which dissolve one another to only a limited extent. In the first class there is a change in volume on mixing generally a decrease and in evolution or absorption of heat occurs. The vapour pressure of such a mixture (a) may be between the two separate vapour pressures when fractional distillation is possible (b) may be greater or less than the vapour pressure of either constituent. In the case of (1) minimum and maximum boiling point mixtures respectively are obtained. On mixing liquids of the second class it is found that each liquid is capable of dissolving some of the other. Thus ether shaken up with water takes up 3 per cent while 10 per cent of the ether is dissolved in the water. The miscibility of two partially miscible liquids is dependent on the temp generally increasing but in some cases diminishing with the temp. Many liquids only partially miscible at ordinary temps become completely miscible at some higher temp which temp has been called the critical S temp e.g. phenol and water. Whenever a solid is brought into the presence of a liquid some of the solid dissolves. The number of such S is infinite, and S of this class are so usual that when the term S is used the S of a solid in a liquid first comes to mind. The solubility of solids in liquids varies very

greatly, some substances being nearly insoluble (such as gold and platinum in neutral liquids), while others are extremely soluble (e.g. the calcium and strontium salts of permanganic acid). There is, however, a limit to the extent to which a solid can dissolve. That point at which a liquid cannot take up more of the solid at a given temp. is called the point of saturation and such a solution is known as a saturated solution. The term unsaturated is applied to S which can take up more of the dissolved substance while S which contain more of the dissolved substance than corresponds to a state of stable equilibrium are termed supersaturated. If a supersaturated solution is shaken with some of the dissolved substance or if a fragment of the crystalline solid is introduced into the solution the excess of solid in solution is deposited and equilibrium is restored. Supersaturated S are most readily formed by salts which crystallise. The solubility of a solid in a liquid generally increases with the rise in temp. although sometimes the reverse is the case e.g. calcium citrate. The rate of S may also change abruptly giving a slower increase or even decrease. Thus nitro is more soluble in hot than in cold water 100 parts of water at 0° C. dissolving 13 parts and at 100° C. 247 parts. For common salt the corresponding amounts are respectively 35.5 and 39.6 parts. In the case of sodium sulphate the solubility increases with rise of temp. up to 34° C. but for a further rise of temp. the solubility gradually diminishes. But two solubilities are really in question here. $\text{Na}_2\text{SO}_4 \cdot 10\text{H}_2\text{O}$ below 34° C. and Na_2SO_4 above. The column salts of organic acids may be cited as types of diminishing solubility with increase of temp. precipitation of solid occurring when a saturated solution is heated. Regarding the real condition of a substance in solution two theories the 'hydrate theory' and the dissociation theory have been put forward. Sometimes the former regards the solution as consisting of definite compounds of solvent and dissolved substance and there is a certain amount of evidence in favour of this. The latter theory was developed from the study of the pressure exerted by dissolved substances. This pressure called the osmotic pressure (see Osmosis) is for dilute S approximately the same as would be exerted by the solute if it existed as a gas and occupied the same volume at the same temp. Thus the ordinary gas laws of Boyle, Gay Lussac and Avogadro were found to hold for S. A close relation has been shown to exist between osmotic pressure and the lowering of the freezing point and the vapour tension of a solution and hence the molecular weights of dissolved substances can be determined from their measurement. These facts are true only for S of substances such as sugar i.e. non electrolytes. The osmotic pressure of most salts and of all the strong acids and bases is greater for all concentrations than would be expected from the laws of gas pressure applied by van t Hoff to the osmotic pressure of S. It was observed

that all these exceptions to the laws of gas pressure had a common property of being electrolysable. Williamson and Clausius had, long before suggested that electrolytes might exist as free 'ions,' each ion being charged with electricity either positively or negatively. The dissociation theory was developed by Arrhenius and methods were pointed out for determining the amount of dissociation from the lowering of the freezing point and of the vapour tension. According to the dissociation theory a substance such as potassium chloride KCl exists in S as potassium and chlorine ions quite free from one another and the free elements are prevented from assuming their ordinary properties by the enormous charge of electricity they bear. When however a solution is placed in a vessel with electrodes and a current is passed the potassium and chlorine move in opposite directions giving up their charge and becoming the ordinary free element at each electrode. The ions behave as if they all had the same capacity for electricity or simple multiples or submultiples of it and hence Faraday's law that equal quantities of electricity require equivalent quantities of the ions for their transport. The dissociation or 'ionic' theory accords very well with experimental facts. Thus the ability of a substance to enter into chemical reaction depends on the number of free ions it contains and Ostwald's determination of the coefficients of affinity from the electric conductivity of S make it evident that electric conductivity depends on the same condition. The thermo neutrality of neutral S pointed out by Hess is explained by the fact that in S there is little decomposable matter the salts present being there as free ions. Also the fact that the evolution of heat is the same when strong acids and bases neutralise one another is explained, since the ions are not changed combination taking place only between H^+ and OH^- to form H_2O thus $\text{K}^+ + \text{OH}^- + \text{H}^+ + \text{Cl}^-$

$\text{K}^+ + \text{Cl}^- + \text{H}^+ + \text{OH}^-$ The ionic theory de-

spite a few discrepancies accounts for so many hitherto unexplained facts and is supported by so much experimental data that its truth must be admitted. Most of the difficulties have been met in trying to account for the behaviour of strong S. In these ordinary laws we not obeyed and it was previously supposed that they contained a large proportion of unionised molecules. Recent work indicates that even these strong S are completely ionised (Debye and Hückel) and that the discrepancies are due to electrostatic action and other causes. See also FLEETON'S. See T. M. Lowry and A. C. Cayll *Intermediate Chemistry* 1. J. B. Partington *General Chemistry* 1916 and I. A. Philbrick and F. J. H. Inman *Textbook of Theoretical and Inorganic Chemistry* 1949.

Solway Firth in part the estuary of the R. Esk and, in part an inlet of the Irish Sea. It separates England from Scotland, that is the N.W. of Cumberland from the

Scottish shires of Wigtown, Kirkcudbright, and Dumfries. Where the viaduct of the former Caledonian Railway spans the firth near Annan it is only 1½ m. wide, but at its mouth the breadth is over 25 m. There are salmon fisheries. The tides ebb and flow with great rapidity, creating a 'bore' of some 10 m.p.h.

Solway Moss, dist. in Cumberland, England, reclaimed bogland, on the Scottish border between the Sark and Esk rvs. The Eng. defeated James V. of Scotland here on Nov. 24, 1542.

Solyman, or **Suleiman II.** (1496-1566), sultan of Turkey, surnamed the 'Magnificent' by Europeans and 'Kanouni' or 'the Legislator' by his compatriots. He seized Belgrade (1522), captured Rhodes from the Knights of St. John (1523), defeated and slew King Louis of Hungary at Mohács (1526), wrested Armenia and the cities of Tabriz and Bagdad from the Persians (1534), conquered Croatia (1537), estab. a pasha in Buda (1511), obliged Austria to pay a tribute of 30,000 ducats yearly and to recognise his suzerainty over Hungary, and in 1560 gained a decisive naval victory over a Christian confederacy at Djerbel. The one calamitous defeat he sustained was at the hands of Jean de La Valette, who saved Malta (1565). He was succeeded by Selim II., S.'s son by a Russian slave, S. murdering his legitimate offspring to further this end.

Soma, or **Homa**, one of the plants from which the ambrosia of the Indian gods is said to be derived, hence it is sacred. The ninth book of the *Rigveda-Samhitā* consists of hymns intended to be recited in honour of S. Various plants with milky latex are said to have been the true S., notably *Asclepias acida* and *Periploca aphylla*.

Somali, The native people of Somaliland. They are a Hamitic race, identical, it seems, with the people of Punt, who figure in early Egyptian hist., and composed of nomads (who preponderate), traders, a few townsmen, and outlying sub-caste tribes. They live in families, grouped in clans, under an elective or hereditary chieftainship. They are mainly Muslims. The S. number about 1,000,000.

Somaliland, country of Africa, popularly called the 'Eastern Horn of Africa,' jutting out into the Indian Ocean along the south of the gulf of Aden. Some 130,000 sq. m. of S. are now included in Abyssinia. S. is traversed by a steep escarp running W., and E. from near Hamar to Cape Gardafui. An arid desert, known as the Haud, lies immediately south of the highlands which gradually slope down to the Webi Shebeyi R. Level scrub-strewn stretches separate this riv. from the Juba, which forms the southern boundary. Hides, gums, ostrich feathers, ivory, cattle, spices, coffee, mother-of-pearl, and gold ingots are the chief exports. See next three articles.

Somaliland, British, Brit. protectorate bounded on the N. by about 450 m. of the gulf of Aden and extending from Loyi Ada, long 43° 15' E. as far as 49° E. long., close to the tn. of Banda Ziada. Its

common frontier with Somalia or what was It. Somaliland before the Second World War runs from Banda Ziada to a point in lat. 8° N., thence the boundary marches with that of Abyssinia to near Jalelo, and with that of Fr. Somaliland from near Jalelo to Loyi Ada on the coast. The area is 68,000 sq. m. The dominant physical features, extending southwards from the coastline, are the Guban, which comprises an almost bare alluvial coastal plain varying in breadth from less than a mile in the E. to 60 m. in the W. and a maritime plain broken with ridges of limestone and hills of igneous rock, and which varies in breadth from about 2 m. to 30 m., the Gols, a vertical escarpment of limestone with foothills and ridges rising to 3500 ft. in height; and the Ogo, a long wide featureless plateau sloping gently to the S.E. into the Haud, a belt of thorn wilderness and pastures, extending into Abyssinia and the former It. ter. of Somalia. The maritime plain, with a hot climate and scanty rainfall, grows in places frankincense and myrrh trees. The ridges and hills near the base of the escarpment have a cooler climate and higher rainfall. On the interior plateau average rainfall ranges from 20 in. in the W. to 8 in. in the S. and S.E. The plateau consists in part of open savanna with thorny acacias and partly of grass-covered plains. This part of the protectorate supports the bulk of the grazing stock, camels, cattle, sheep, and goats, on which most of the native pop. subsists. On some parts of the maritime plain and of the escarpment is grown a plant somewhat like sisal, but its fibre has not the commercial value of the latter. The protectorate is administered by a governor whose powers are defined by Somaliland Orders in Council, 1929 to 1935. For administrative purposes the country is divided into six dists., each under a dist. officer. The six dists. of the country are Berbera, Burao, Borama, Eligavo, Har-gesa, and Las Anod.

About one-third hundredth of the country is under arable agriculture, the rest is pastoral land. All cultivation is by natives, who farm the land subject to official permission. Most of the people are nomads and sheep, goats, and cattle are their wealth. Agric. production is limited to sorghum, maize, gram, beans, a little wheat, and barley. Exports consist chiefly of sheep and goats and the skins of these animals, while the chief imports are articles of native consumption and clothing, namely rice, dates and sugar and textiles. Tropical fish of every kind are abundant. The chief ports are Berbera, Zeilaa, and Las Khorah. There are no railways and all transport is by road. Some 2000 m. of road are suitable for wheeled traffic. There are wireless stations at all the ports, as well as ordinary telegraphs. There is a police force and a camel corps.

Before 1884 the administration of the Somali coast was in Egyptian hands. When it collapsed in that year a protectorate was proclaimed by Britain, and the boundaries settled with France, Italy,

and Abyssinia. The protectorate was administered by the resident at Aden as a dependency of India until 1898, when it was transferred to the charge of the Foreign Office. In 1905 it was transferred to the Colonial Office. Between 1901 and 1920 the hist. of the country is that of campaigns against Mohammed bin Abdulla Hassan, the 'Mad Mullah.' In 1901-3 expeditions were sent against him, and in Jan. 1904 he was defeated at Jidballeh. He retired into Somalia and sought It. protection. An agreement was made between him and the It. Gov., but he soon disregarded its terms and attacked tribes under Brit. protection. From 1914 desultory fighting continued till 1920, when a combined attack with land and air forces scattered the mullah's followers and captured all his forts and possessions. He fled into Abyssinia, where he died in the following year. In the Second World War B. S. was invaded by It. forces on Aug. 4, 1940, the Fr. surrender of Jibuti having left the dependency isolated and surrounded by It. ter. See further under ITALIAN EAST AFRICA. CAMPAIGNS IN. The Somali pop. was estimated at 344,700 before the war. The non-native pop. is probably less than 3000, being mainly Arabs and Indians.

See R. E. Drake-Brockman, *British Somaliland, 1912* (descriptive and ethnological); H. Rayne, *Sun, Sand, and Somalia*, 1921 (light descriptive); D. Jardine, *The Mad Mullah of Somaliland*, 1923; and E. Sylvia Pankhurst, *Ex-Italian Somaliland*, 1950.

Somaliland, French ('Côte française des Somalis'), Fr. colony commanding the southern entrance to the Red Sea. It has an area of 9071 sq. m. The protectorate comprises coast stations with a hinterland. In 1896 the seat of government was removed from Obok to Jibuti on the bay of Tajura. A railway runs from Jibuti to Addis Ababa, the cap. of Abyssinia, which greatly augmented the strategic importance of the former. Traffic which used to go by camel through Zeila now reaches Abyssinia by rail. In Jibuti, a Fr. mission school for boys and one for girls was opened in 1902, but these were replaced in 1922 by a public elementary school. There are very few industries, pearls, shells, and mother-of-pearl being the most important. Salt mines were opened in 1912 at Lake Assal. Cotton is grown, dates, coco-nuts, mangoes, and vegetables, and there is considerable traffic between the coast fisheries and the inland trade. Jibuti is in communication with Aden, France, and other European countries. The prin. exports are coffee, hides, skins, ivory, and salt. The native pop. in 1946 was estimated at 44,800 (Somali 15,700, Arabs 5800, Danakils 21,100); Europeans numbered 1500. See *Journal officiel de la côte française des Somalis*.

Somaliland, Italian (Somalia), former It. colony along the E. coast of Africa from Brit. Somaliland to Dick's Head, Kenya. The boundaries inland were settled by treaty with Abyssinia in 1908, and are roughly at some 180 m. from the

coast; under the treaty of London, 1915, and an agreement in pursuance of that treaty after the First World War, Great Britain gave up to Italy ter. lying on the r. b. of the Juba R., together with the port of Kismayu. In 1936 It. S. was incorporated, with Eritrea and Abyssinia, in the new gov. of It. E. Africa. Its futuro after the 1947 peace treaty remained undecided.

The chief occupations are stock-raising and agriculture. The Mijortins rear camels and sheep. The climate is tropical and hardly favourable to Europeans; but with good irrigation schemes, the coastal areas lend themselves to intensive cultivation of such tropical products as cotton, sisal, sugar cane, and oil-seed plants. Exports consist chiefly of sesame oil, gum, ivory, resin, hides, butter, cotton, and kapok. Gov. factories at Vittorio d'Africa were built for dealing with agric. products. At Brava there is a tannery at which sandals, bags, and cushions and other leather goods are made; and at Mogadishu, Merca, and other places there are engineering shops; the manuf. of sea salt is carried on in the bay of Hafun with a yearly output of 300,000 tons. There is also fishing for tunny and for mother-of-pearl. There are 113 km. of railways. A highway from the port of Mogadishu, planned to replace the 1200-m. track built during the It.-Ethiopian campaign of 1935 to connect the port with Addis Ababa via Jijiga, Harar, and Dire-dawa, was completed as far as Harar. The pop. in 1931 was 1,021,000, including 1600 It.

Soon after the occupation of Massawa in 1885 an It. naval mission secured a treaty with the sultan of Zanzibar, giving to Italy commercial rights whereby in effect the Somali coast came under It. protection. This area was extended by agreement with Britain. The colony was at first given as a concession to a company and only became a formally constituted It. colony in 1905. The respective spheres of influence of Britain, France, and Italy in S. were settled by treaty in 1906. The frontier with Abyssinia was fixed in 1908. After the First World War extensive claims were made on the Brit. ter. adjacent to Somaliland. These were met, to a very limited extent, by the cession to Italy of Jubaland, a good cotton-growing area, by the Convention of London, July 15, 1924. Finally, a short campaign in 1926-27 brought the hitherto independent sultanates under direct It. rule. In the Second World War the It., after overrunning Brit. S. in 1940, lost the initiative in their own ter. in Jan. 1941. S. was under Brit. military administration from 1941 to 1950. It was then transferred to It. sovereignty under a ten-year trusteeship by the United Nations. See ITALIAN EAST AFRICA. CAMPAIGN IN. See E. Cucinotta, *Diritto Coloniale Italiano*, 1933; R. Clasca, *Storia Coloniale dell'Italia Contemporanea*, 1940; Royal Institute of International Affairs, *The Italian Colonial Empire* (Information Department Papers, No. 27), 1940; E. Rosenthal, *The Fall of Italian East Africa*, 1941.

Someisat, *see* SAMOSATA.

Somersby, *vii.*, the bp. of Tennyson, 7 m. N.W. of Spilby, in Lincolnshire, England.

Somerset, Dukes of, Eng. family descended from the legitimated children of John of Gaunt and Catherine Swynford. The first duke was John Beaufort (1404-1444), grandson of John of Gaunt and third earl of Somerset. His daughter was the mother of Henry VII. He fought with Henry V. in Aquitaine and Normandy, and was created duke in 1443. The title was re-created for his younger brother, Edmund Beaufort (*d.* 1455) in 1448. He was killed at the first battle of St. Albans, whereupon his son, Henry (1436-64), succeeded to the dukedom. Henry was a distinguished Lancastrian, and fought at Wakefield (1460) and St. Albans (1461), and was finally captured and executed by the Yorkists at Hexham. The family titles were forfeited, though Henry's brother, Edmund (c. 1438-71), was styled fourth duke till his death after the battle of Tewkesbury. The present bearers of the title, whose family name is Seymour, descend from a Norman family, who came from St. Maur in Normandy to England in the thirteenth century. The first duke of this line was Edward Seymour (*q.v.*) (1606-52), brother-in-law of Henry VIII. and protector of England in the reign of Edward VI. Other illustrious members of this family are Wm. Seymour, second duke (1588-1660), husband of Arabella Stuart; Charles, sixth duke (1662-1748), a member of the Kit-Kat Club and a Tory favourite of Queen Anne, and Algernon, seventh duke (1681-1750), governor of Minorca (1737-42), who died without male issue. The eighth duke, Sir Edward Seymour, of Berry Pomeroy (1695-1757), claimed the title by his descent from the first duke by his first marriage. *See also* BLAUFOORT.

Somerset, Edward Seymour, Duke of (c. 1506-52), protector of England. He served in France as soldier and diplomat. Henry VIII. married his sister, Jane Seymour. On the death of the king in 1547 S. was chosen as protector during the minority of Edward VI. His efforts to conciliate the Scots were abortive, but he defeated them at the battle of Pinkie (*see* PINKIE) in 1547. By the Act of Uniformity (1549) he tried to enforce the use of the first (and most extreme) Book of Common Prayer. He disagreed with the council and was imprisoned in the Tower (1549), and again in 1551 on an unproven charge of treason, but was condemned on a technical charge and executed.

Somerset, Robert Carr, or Ker, Earl of, and Viscount Rochester (1589-1645), Scottish politician and a favourite of James I., of the family of Ker of Ferniehurst. His good looks won him royal favour: he was given Sir Walter Raleigh's manor of Sherborne (1609), and was created Viscount Rochester (1611) and earl of Somerset (1616). He married the divorced countess of Essex (1613), and having lost favour with the king after the rise of Villiers, duke of Buckingham, was convicted of impeachment in the poisoning

of Sir Thomas Overbury (*q.v.*). He was imprisoned from 1616 to 1622, but received a royal pardon.

Somerset, *see* SOMERSETSHIRE.

Somerset, or North Somerset, *is.* of the N. Amer. archipelago, divided by the Bellot Strait from the N.W. Ter. of Canada, of which it is a part.

Somerset House, Brit. Gov. building in London, in which the commissioners of inland revenue, the registrar of joint stock companies, the probate and divorce registrar, and other officials have their offices. The E. wing is in the occupation of King's College. The site of this huge edifice, which was built towards the close of the eighteenth century, was formerly that of the old 'Inne of Chancery' and other adjoining buildings which in 1549 were pulled down by Edward, duke of Somerset, who erected there (1549-52) the palace of the dukes of Somerset. This palace, according to Stow, was also used by Queen Elizabeth as one of her royal dwellings.

Somerset Light Infantry (Prince Albert's), Brit. regiment, the old 13th Foot, raised in 1685. In 1706 the earl of Peterborough converted it into a regiment of dragoons, which saw much service in Gibraltar and at Dettingen. It fought at Culloden, with which action the unique practice of the sergeants of the regiment wearing their sashes over the left shoulder is traditionally connected, the officers having all become casualties. For distinguished services at Jellalabad, 1842, the regiment was granted the mural crown super-scribed 'Jellalabad'. It was in the Crimean and Afghanistan, and later in the Burmese and S. African campaigns. During the First World War it raised sixteen battalions, which served in France, Flanders, Palestine, Mesopotamia, and N.W. Frontier of India. In the Second World War the S. L. I. fought in Italy, Burma, and on the W. front. They were part of the Second Brit. Army which fought the battles of the Rhine operations of March 1945. The regiment was in especially fierce fighting around Goch. The 1st battalion of the S. L. I. were the last Brit. troops to leave the dominion of India, they sailed from Bombay on Feb. 29, 1948.

Somersetshire, maritime co. in the S.W. of England, bounded S.W. by Devon, S.E. by Dorset, E. by Wiltshire, and N.E. by Gloucester, while the Bristol Channel washes its N. and N.W. shores. Area 1,036 818 ac. The coastline consists of low cliffs and marshy hollows alternately, and its chief inlet is Bridgwater Bay. The only important harbours are at the mouths of the Avon and Parret, which are the two prin. rivers, and which, like most of the other streams, flow through the co. in a N.W. direction. Other rivers are the Axe, Exe, Brue, and Yeo. The most prominent surface features of S. are the Mendip Hills towards the N. and the Quantock Hills towards the W., extending from Taunton N.W. towards the sea, culminating in Will's Neck (1270 ft.). Fens and marshes on the channel shore are numerous. The wild forest of Exmoor

lies partly in the extreme W. of the co. and partly in Devon. Dunkery Beacon (1707 ft.), the highest point in the co., is in this dist.

Agriculture and dairy-farming flourish in the co., and the manuf. of the famous Cheddar cheese is an important industry. The chief crops are wheat, barley, oats, turnips, mangolds, etc.; teasels are grown for the woollen industry. Large numbers of sheep and cattle are reared. There is a breed of hardy ponies peculiar to the Ex-moor dist., where red deer also are found. The numerous orchards scattered about the co. supply the cider-making industry.



John H. Stone

GLASTONBURY ABBEY, SOMERSETSHIRE
The Lady Chapel (late twelfth century).

The minerals include iron, lead, zinc, slate, and fuller's earth, besides the well-known Bath freestone. Coal is mined at Radstock in the Mendips. The prin. towns are Bristol (partly in Gloucester), Bath, Wells, Taunton (the co. tn., superseding the old 'cap.' Somerton), Weston super-Mare, Bridgwater, Yeovil, Frome, and Glastonbury. Bath, rich in Georgian architecture, has been famous since the Rom. occupation for the therapeutic efficacy of its thermal springs. The manufs. include woollens, worsted and silk goods, gloves, sail-cloth, and linen shirts, brushes, agric. implements and machinery, and Bath-bricks manufactured at Bridgwater from the sand of the R. Parret. Salmon and herring are caught. The co. returns six members to the House of Commons.

S. was originally part of the kingdom of Wessex, and figured largely at the time of King Alfred's struggle with the Danes. During the Civil war two battles were fought at Lansdown and Allermoor, in

1643 and 1645 respectively. Monmouth was proclaimed king at Taunton in 1685, but was taken at Sedgemoor soon after. S. contains many remains of abbeys and castles, notably at Glastonbury and Dunster, while there is a celebrated cathedral at Wells and a fine abbey church at Bath. Numerous Rom. remains have been discovered throughout the co., including a large mosaic pavement near Langport, while the Mendip caves have yielded many relics of prehistoric man. There are many late Saxon stone carvings in the church at Milborne Port.

See W. Phelps, *History and Antiquities of Somerset*, 1839; *Victoria County History: Somerset* (ed. W. Page), 1911; K. Hutton, *Highways and Byways in Somerset*, 1912; D. P. Dobson, *Archæology of Somerset*, 1931; A. Moe, *Somerset*, 1941; J. H. Ingram, *Companion into Somerset*, 1948; S. Town-end Warner, *Somerset*, 1949; M. Lovatt Turner, *Somerset*, 1949; and M. Fraser, *Somerset* (Batsford's Little Guides), 1949.

Somerset Nile, see under NILE.

Somers Islands, see BERMUDA'S.

Somerton, par. and tn. of Somersetshire, England, 5 m. N.N.W. of Ilchester. It was a residence of the Saxon kings and cap. of Somersetshire. Pop. 2000.

Somervell, Sir Arthur (1863-1937), Eng. composer and educationist, b. at Windermere. He was educated at Uppingham and King's College, Cambridge, where he studied composition with Stanford, in Berlin, and with Parry. In 1894 he became prof. at the Royal College of Music, and in 1901 an inspector of music in schools, this leading to an appointment as official inspector of music to the Board of Education, which he resigned in 1928. His songs, especially settings of lyrics from *Maud* and *A Shropshire Lad* are his best-known works. He also composed two masses, cantatas, a symphony, and other works, and ed. *Songs of the Four Nations* (folk-songs).

Somerville, Edith Cænone (1858-1949), Irish novelist, short story writer and artist, b. in Corfu, daughter of Lt.-Col. S. of Skibbereen. Educated privately and at Alexandra College, Dublin, she studied painting in Paris and London, and was sufficiently successful with black-and-white illustrations to have followed art as her *métier*. But a talent for writing was discovered by her cousin, Violet Florence Martine (d. 1915), with whom for the rest of the latter's life she collaborated in writing novels and stories under the names of 'E. Cæ. Somerville and Martin Ross'. All their stories are informed with high spirits and a fresh and lively wit, and also with an imaginative quality that is deeper than the humour. *Experiences of an Irish R.M.* (i.e. resident magistrate), pub. in 1899 (Everyman's Library, 1933), and illustrated by Miss S., is the most famous of their joint productions. There are 3 vols. of short stories supposed to be narrated by the 'Irish R.M.': *Some Experiences of an Irish R.M.* (1899), *Further Experiences of an Irish R.M.* (1908) (these two constitute the Everyman's Library vol.), and *In Mr. Knox's*

Country (1915). All three vols. are noted for the character Flurry Knox. Of the previous jointly written novels, *The Real Charlotte* (1894), however, attains a rarer degree of imaginative insight. Other works of the partnership are *All on the Irish Shore* (short stories, 1903); *Dan Russell, the Fox* (1911); and the posthumous *Maria and other Dogs*. After the death of Miss Martin Miss S. continued to produce novels, in which the two names appeared on the title-page. Among them were *Mount Music* (1919); *Stray-aways* (1920); *An Enthusiast* (1931); *The Big House at Inver* (1925). She also wrote a biography of Miss Martin, and a life of her maternal grandfather, Charles Kendal Bushe, chief justice of Ireland, under the title *An Incorruptible Irishman* (1932). Other works include *The Smile and the Tear* (a vol. of essays, 1933); *The Sweet Cry of Howards* (hunting sketches, 1936); *Sarah's Youth* (a hunting story, 1938); *Notions in Garrison* (1942); and *Maria and Other Dogs* (pub. posthumously).

Somerville, Mary (née Fairfax) (1708-1872), Scottish writer on mathematics and physical science, b. at Jedburgh. In 1804 she married her cousin Capt. Samuel Greig, who died in 1806. In 1812 she married another cousin, Dr. Wm. S., and removed to London, where in 1826 she read a paper before the Royal Society on the *Magnetic Rays of the Solar Spectrum*, in consequence of which she was requested by Lord Brougham to translate Laplace's great work, the *Mécanique céleste*. This she pub. in 1831; *The Connexion of Physical Sciences* appeared in 1834; *Physical Geography* in 1848; and *Molecular and Microscopic Science* in 1869. She founded a scholarship at Oxford, and Somerville College was named after her. See her *Personal Recollections* (ed. by her daughter) 1873.

Somerville: 1. City in Middlesex co., Massachusetts, U.S.A., adjoining Boston. It has slaughtering and meat-packing industries and numerous manufs. Pop. 102,200. 2. Tn and co. seat of Somerset co., New Jersey, U.S.A., 36 m. W S.W. of New York. Pop. 8700.

Somerville College, Oxford college for women, on the Woodstock road, whose members (like those of Lady Margaret Hall, St. Hugh's College, St. Hilda's College, and St. Anne's Society) are members of the univ. and are admitted under a statute of 1920 to all Oxford degrees except B.D. and D.D.) on the same conditions as men. Diplomas may be obtained through the college, in education, anthropology, etc. There are a number of scholarships and exhibitions. Candidates for admission to S. C. must pass an entrance examination and respondions or an equivalent examination. S. C. was founded in 1879 as Somerville Hall, and was named after Mary Somerville (q.v.). It was founded on an inter-denominational basis; its chapel is undenominational and there is no college chaplain. Past principals of S. C. include Dame Emily Penrose and Margery Fry. Winifred Holtby, Dorothy L. Sayers, Eleanor

Rathbone, and Dame Evelyn Sharp were undergraduates there.

Somma: 1. Tn. of Varese, Italy, 4 m. S.E. of Lake Maggiore. Pop. 9500. 2. Tn. of Italy, 9 m. E. of Naples, near Mt. Vesuvius. Pop. 15,800.

Somme: 1. Maritime dept. of N. France, formed from part of the auct. prov. of Picardy, and watered by the lt. S. There are four arron.: Amiens, Abbeville, Montdidier, and Péronne. The surface is level, and the soil produces corn, beets, and garden fruits, and forms excellent grazing ground. The manufs. are textiles, chemicals, sugar, and paper. Cap. Amiens. Area 2443 sq. m. Pop. 411,300. 2. Riv. of N. France, rises near St. Quentin, and flows into the Eng. Channel. It has a length of 140 m., and is connected by canal with the Oise and the Scheldt.

Somme Battles: 1. First important battle took place during the late summer and autumn of 1916. The Brit. and Fr. attacked the Gers. between Beaumont-Hamel on the N. and Chaules on the S. of the riv. The junction of allied forces was at Maricourt, just N. of the Somme. The Gers. were prepared for an attack by the Brit. towards Bapaume, but not for a Fr. offensive on the riv. The attack was launched on July 1, 1916, and on the extreme left the Brit. were held up, but further S. good progress was made. The Fr. also made good progress towards Péronne. The strength of the Ger. lines was unsuspected, and successive series of trenches were discovered, making a breakthrough practically impossible. On July 14 Bazentin, High Wood, Longueval, and Delville Wood were captured by the Brit. Before the end of the month Ouiliers and Pozieres were taken. During Aug. little headway was made, but during Sept. Guillemont, Le Forest, and Cléry were gained, after strong resistance, and later the line was pushed forward through Thiepval, Flers, Combes, E. of Cléry, Belloy, and Estrées. Pressure was maintained until Nov., and the line eventually rested on Serre, Le Transloy, W. of Péronne and Chaules. 2. During the last Ger. offensive, in the spring of 1918, the Gers. advanced on both sides of the Somme from St. Quentin to Villers-Bretonneux. The onset was so sudden that they gained much ground, particularly on the N. bank, where the Brit. were very weak. The Gers. maintained pressure until April 23, on which date their line in this area ran from Albert, N. of the Somme, to the W. of Moreuil on the Avre. 3. During the allied counter-offensive the Amers. and Australians, fighting side by side, captured Hamel on July 19, 1918. The success of the Fr. S. of the Somme about Noyon, threatened the Gers. on the Somme, and they began to crumple in this area, and by Aug. 31 Péronne had fallen to the allies. The victorious allies then simply swept on, and soon cleared the Somme area (see FRANCE AND FLANDERS, FIRST WORLD WAR CAMPAIGNS IN).

There were no comparable battles on the Somme in the Second World War. In 1940 at the end of May Gen. Weygand tried to reorganise the Fr. Armies along

the line of the Somme and Aisne Rs., but on June 7 the Ger. armour dashed forward from a Somme bridgehead, and two days later had reached Rouen. Similarly when the tables were turned in 1944 there was no battle; the Brit. 21st Army Group broke out in Aug. in the direction of Beauvais, captured Amiens, and crossed the Somme, and a headlong drive then followed along almost the whole front.

Sommerfeld (Polish Lubsko), tn. in Poland, on the R. Lubat, 44 m. S S E of Frankfurt am-Oder. It manufs. cloth and machinery. Pop. 15,000.

Somnambulism (Lat. *somnus*, sleep, *ambulare*, to walk), an example of massive dissociation, dramatised as a general automatism, which begins during and interrupts the course of normal sleep. The phenomenon is a hysterical manifestation of conflict and is seen as an occasional symptom in anxiety states. The underlying system of dissociated ideas may be relatively simple or very complex, a fact which led Janet to classify S. as monoidic and polyidic. The splitting of the stream of consciousness makes it possible for the patient to live through some vivid phantasy which bears little or no relation to his environment, and which is therefore hallucinatory in character. By speaking to his gently and persuasively it is sometimes possible to break into this phantasy and to get the patient to answer questions regarding it. A certain percentage of S. occurring in childhood are thought to be due to physiological rather than to psychological causes. These are met with in so called glycopenic children. Contrary to popular belief patients may meet with serious accidents while in somnambulant states. See also **PSYCHONEUROSIS**. See B. Hart, *The Psychology of Insanity*, 1922; R. C. Gordon, in *Introduction to Psychological Medicine*, 1936; and D. K. Henderson and R. D. Gillespie, *A Textbook of Psychiatry* (6th ed.), 1944.

Somnath, or Patan, ruined tn. on the Kathiawar Peninsula, Saurashtra, India, 38 m. N W of Dm. It has many interesting ancient remains and shrines which are visited by large numbers of pilgrims. The tn. was captured and the temples despoiled by Mahmud of Ghazni in 1024. The famous gates were brought back to Delhi by Lord Ellenborough in 1842.

Somnus, Lat. name for the Gk. god of sleep (Hypnos). He was the son of Erebus and Nox and the brother of Death. Morpheus was his minister, and the Dreams watched over his slumbers. S. and Death are usually represented in art as two youths, sleeping, or holding in verted torches in their hands.

Sonata, term designating both a type of composition and a musical form. The S. as a type is now normally a composition in three or four movements, only the first of which is with few exceptions in S. form and often the last, though that is at least as frequently a rondo. The word is the feminine past participle of the It. *sonare*, to sound, a S. is thus originally simply 'a thing sounded,' i.e. played, as distinct from

a cantata (from *cantare*), 'a thing sung.' But in the seventeenth century the S. developed into the *S. da camera* and the *S. da chiesa*.

In the next century the one-movement S. of Scarlatti began to approximate to modern first-movement form, while other works of the kind, especially in Ger., still approximated to the suite, from which indeed the mature S. borrowed the minuet, which it later developed into the scherzo, but often dropped in favour of a three-movement composition: first movement in S. form, slow movement, and finale in S. or rondo form. The modern first movement form developed through C. P. E. Bach and some of his contemporaries, reached full maturity in the hands of Haydn, Mozart, and others, and was greatly stimulated by the innovations of Beethoven *e.g.* in his type of *S. quasi una fantasia* and his late works of the species, which admitted fugal developments and made much of the variation form. But it was only after Beethoven in the nineteenth century that the S. became often so much modified as to lose its shape, *e.g.* in the hands of Schumann and Chopin, to whom it was uncongenial, or in those of Liszt who introduced his principle of thematic transformation (as distinct from development) into it.

The S. form in its fully matured but not sophisticated manifestations shows the following main outlines: a single movement in two prin. sections, the first called the exposition, ending in another key than that of the tonic. Two main thematic groups make up its material, with room for subsidiary themes and connecting bridge passages, and these groups are not very accurately but conveniently described as first and second subjects. The first is in the tonic key, the second usually in the dominant in a movement in a major key and in the relative major in one in a minor key. The second section begins with a development or working-out, which, as its names suggest, develops some of the foregoing material in new ways, but may also partly or even exclusively introduce new matter (*e.g.* Mozart), which however in the hands of a master will be relevant to the prin. material. This development leads to the recapitulation, where the opening of the movement, i.e. the first subject, returns as before, though possibly with new embellishments. The second subject, however, now also appears in the tonic key, major or minor, and in the latter case it is normally in minor even if in the first section it appeared in major. All this necessitates a new modulatory transition between first and second subjects, and it is often here rather than in the working-out that the greatest point of interest or surprise of a S. movement lies. The movement may end in the tonic exactly as the first section ended in another key; but there may be a coda added, either a very brief tail piece of a merely ceremonial nature or a more developed section which may further work upon the foregoing material, as often in the case of Beethoven. Not only works so called are Ss., but also chamber music

of the normal 'classical type and symphonies.

Sonchus, genus of composite plants whose species are commonly known as sow-thistles, belongs entirely to the Old World. There are in all forty-five species, and of the three common to Britain *S. oleraceus*, the common sow-thistle or hare's-lettuce, is the best known. It is an ann. bearing yellow flowers, and is eaten by pigs and sheep.

Sønderborg, seaport tn. in the prov. of N. Slesvig, Als Is., Denmark. Its connection with the mainland is by means of a bridge. The church is medieval, and the S. Palace (dating back to the twelfth century) contains the co. museum; King Christian II. was imprisoned in the palace 1532-49. The tn. was bombarded by the Prussians in April 1864. Pop. 14,100.

Sonderbund Civil War, see SWITZERLAND, *History*.

Sonderhausen, tn. of Thuringia, Germany, 37 m. by rail N. of Erfurt. It was the cap. of the former central principality of Schwarzburg-S. Potassium salts are mined. Pop. 12,000.

Sondrio, tn. and cap. of the prov. of S., Italy, on the Mafro, 25 m. E.N.E. of Colico, producing wine and silk. The prov. chiefly consists of the Adda valley; chestnuts, silk, and wine are the chief products. Area of prov. 1233 sq. m. Pop. 156,300. Pop. of tn. 13,900.

Song, an art-form combining poetry and music, usually for vocal solo and accompaniment. The first phase of the modern art of S. is to be found in the troubadour period (tenth to fourteenth centuries), although folk-songs, chants, and other forms of intoned declamation of verses had been known from the first (see FOLK-SONG and MUSIC). A notable development in the direction of an original song-type with instrumental accompaniment took place in the sixteenth century when the lute composers of England, France, and other countries cultivated the art of singing to their instrument. The introduction of opera (*q.v.*) in the seventeenth century had a profound effect on the development of S., leading as it did to the devising of vocal forms and styles, such as recitative and aria, and to the perfecting of methods of using the voice which were reflected in more elaborate styles of writing for it. By the early eighteenth century the concert aria was well estab.; and during that century the ground was prepared for the art-song of the Romantic period. Schubert with his wealth of melody, and Mendelssohn with his exquisite finish, constituted the transition to the perfection of Schumann and Brahms. The modern art-song is more a poem for voice and piano than a vocal tune with just an accompaniment. Such different types of song-writers as Grieg, R. Strauss, Hugo Wolf, Granville Bantock, Debussy, and Vaughan Williams must be specially mentioned amongst the numerous modern masters of S. See also CANTATA; CANZONET; CAROL; GLEE; MADRIGAL; MEISTER-SINGERS; MINNERINGERS.

Songari, see SUGARI.

Songhay, *Songhai*, or *Sonrhay*, negroid

people of the W. Sudan, Africa, in the bend of the Niger below Timbuctoo. They show Arab and Libyan descent, and are Moslems. See also under GAO.

Songkila, see SENGGOBA.

Song-Kol, or Red River, riv. of China, flowing through Yunnan and Tongking, and emptying its waters by a delta into the gulf of Tongking. Its course is much impeded by rapids, but part of it is navigable.

Song Thrush, or Mavis (*Turdus ericetorum*), familiar bird throughout Europe with a loud, sustained, richly varied song. It is about 8½ in. long; the upper parts are light brown, the wing coverts tipped with reddish-yellow, and the yellowish neck and breast spotted with dark brown.

Sonnet, The, decasyllabic or hendecasyllabic iambic poem, containing fourteen lines, which are divided into an octave of two quatrains and a sestet of two tercets. The S. is of It. origin, and was first used in the fifteenth century. In its pure It. form the rhymes are arranged in the order: *abba, abba*, for the octave, and *cde, cde*, for the sestet. This poetic form is peculiarly well suited to the flowing and melodious language of its native country, and when it was adopted by Eng. poets in the sixteenth century it was found necessary to allow some structural alteration, so that the S. might be moulded in the less musical language. These early Eng. employers of S. form were Surrey and Wyatt, followed by Spenser, Drayton, and Sir Philip Sidney. Spenser tampered with the rhymes in the octave, introducing a third rhyme, which was carried into the sestet. From these altered forms sprang the *English Sonnet*, which was to win fame on its own account. The Shakespearean S. broke away entirely from the It. traditions, and produced a poetic form of singular sweetness and beauty. His rhymes were arranged in a new order: *abab, cdcd, efef, gg*, thus doing away with the octave and sestet, and substituting three quatrains and a couplet. Naturally these differed in effect from the flowery It. S., but the form was in this case so admirably adapted to the expression of the poet's ideas that Shakespeare's Ss. are among the finest ever composed. With the appearance of Milton the S. was once more written on its original model, with the rhymes in their former position, though on occasion Milton changed the order of the rhymes in the sestet to *cd, cd, cd*. Another departure introduced by the latter poet was the abolition of the pause at the end of the octave. Hitherto there had been a pause not only at this point, but also at the end of each quatrain and tercet. Milton's plan of going without interruption from one quatrain to another, or from octave to sestet, gave an effect of grandeur and nobility to his Ss. which more than justifies his departure from the hard and fast rules governing the pure It. type. From the time of Milton onwards the S. received but little attention from Eng. poets till Wordsworth and Keats rescued it from the oblivion into which it had fallen. Again it was the It. S. which

was produced. Rossetti is another poet who used S. form largely, and with fine effect. Elizabeth Browning's *Sonnets from the Portuguese* (1847) are remarkable for their beauty and are among the most widely known of her works. See T. W. H. Crosland, *The English Sonnet*, 1926; A. E. Housman, *The Name and Nature of Poetry*, 1933; and E. Hainer, *The English Sonnet*, 1937.

Sonora, state in N.W. Mexico, situated W. of the U.S.A. and E. of the gulf of California. The chief riv. is the Yaqui. The E. is mountainous, rising in the Sierra Madre, where deposits of gold, silver, lead, copper, coal, iron, and graphite are found. The chief port is Guaymas, and the cap. Hermosillo. Area 70,477 sq. m. Pop. 364,200.

Sonsonate: 1 Dept. of El Salvador, sloping down to the Pacific. Coffee, tobacco, sugar, cabinet woods, and fruit are produced. Area 540 sq. m. Pop. 100,000. 2 Cap. of the above, 55 m. W. by S. of San Salvador. It is in the centre of a dist. rich in agric. and other produce. Cotton, cloth, cigars, and baskets are produced, and cream cheese is a well known product. The nearby Izalco volcano is active. Pop. 18,000.

Sonthals, see **SANTALS**.

'Soo Canal, Tl., see **SAULT SAINT-MARY**.

Soochoo, or Soochow, see **SU CHOW**.

Sooloo Archipelago, see **SUTU**.

'Sooner State', see **OKLAHOMA**.

Soot, finely divided carbon, deposited as the result of incomplete combustion of organic matter, such as bituminous coal, wood, oil, etc. It contains some quantity of hydrocarbons and ammonium sulphate (when obtained from wood or coal), and is used as a manure. S. obtained from resins is used for pigments. See **CARBON**.

Sophia (1630-1714), electress of Hanover, daughter of the Princess Elizabeth of England by Frederick V., elector palatine of the Rhine, and grand-daughter of James I. (VI. of Scotland), b. at The Hague. She married in 1658 Ernest Augustus, the youngest of the four brothers representing the Lüneburg branch of the house of Brunswick, their eldest son, George Louis, afterwards becoming king of England as George I. Ernest Augustus having died in 1698, a new Act of Settlement was proposed in the Eng. Parliament in Jan. 1701, settling the Crown at the death of Anne upon the Princess S. and her heirs, 'being Protestant,' which received the royal assent in June of the same year. In June 1714 the Electress S. died suddenly in her garden at Herrenhausen, and on the death of Queen Anne, which followed soon after, S.'s eldest son succeeded to the throne of England. See Sir A. W. Ward, *The Electress Sophia and the Hanoverian Succession*, 1909.

Sophia (Bulgaria), see **SORIA**.

Sophia, Saint (Gk. Ἁγία Σοφία, Holy Wisdom). The word 'Saint' here retains its original meaning as an adjective, and does not mean a holy person. The Holy Wisdom or Logos was a term used for Christ Himself, to whom under this title many churches have been dedicated.

Sophists (Gk. σοφισται), practical teachers in Athens and Greece of rhetoric and of the art of disputation. They were not a school, or sect, but a class of popular lecturers, who aimed at imparting universal culture. A sophist meant, literally, a wise man, with, however, always an element of professional skill above his wisdom. Thus Pythagoras and Socrates were sometimes referred to by writers of their own times as S. Even Plato, who lost no opportunity of ridiculing S., was described as one. After 450 B.C., however, the term S. covered those who taught for pay, and because of the repugnance which men like Socrates and Plato cherished against this practice, it began to acquire an invidious meaning. The subject of their teaching really amounted to 'how to get on in life,' whether by the 'virtue' of Protagoras, the oratory of Gorgias, or the memory-training of Hippias. For this reason a sophist now means one who merely pretends to knowledge, or who attempts to make the worse appear the better cause. Under the Rom. Empire, until the final triumph of Christianity the term sophist was restricted to teachers of rhetoric, which was now fast becoming a literary exercise practised for its own sake. See J. Burnet, *From Thales to Plato*, 1914 and W. Jaeger *Paideia* (Eng. trans. 1939).

Sophocles (c. 496-405 B.C. or 495-106 B.C.), Athenian dramatist and tragic poet, b. at Colonus, son of Sophilus (or Sophilus), member of a noble family. It seems evident that S. received an excellent education, in both of the chief branches of Gk. education, music and gymnastics, he was carefully trained, and in both he gained the prize of a garland. Apart from his victories in the tragedians' contests, the event of his life most fully authenticated is that in 545 he was appointed as one of the generals to serve with Pericles in the Samian war (440-439 B.C.), and it is also supposed that S. then made, or renewed, his acquaintance with Herodotus whom, however, some say he knew earlier in Athens. For the rest it is supposed that he took his share of civic duties, and was even selected to serve on foreign embassies. On the evidence of Aristophanes (*The Frogs*) and the ancient biographer of S., it seems that he was universally beloved for his amiable character.

His first appearance as a dramatist was in 468 when, at the age of twenty-eight (or twenty-seven) he came forward as the rival of the veteran Aeschylus. This is supposed to have been on the occasion of the return of Cimon from his expedition to Scyros, bringing back the remains of Theseus. Public expectation was enhanced and party feeling ran high. The archon, whose duty it was to choose the judges, administered to Cimon and his colleagues the oath appointed for the judges of dramatic contests. Their decision was in favour of S. for his *Triptolemus*, the second prize only being awarded to Aeschylus, and from this time S. held the supremacy of the Athenian stage until he was defeated by Euripides (441 B.C.). That

Æschylus learned much from the skill of his younger rival, may be seen from the plays which he afterwards produced, especially from the great Oresteian trilogy. From 438 onwards S. had to contend with Euripides, over whom he was generally successful. S. had little to add to the drama as constituted by Æschylus. S. it was who probably (1) raised the number of the chorus from twelve to fifteen, giving it, however, a less direct share in the action of the play than is the case with Æschylus; (2) introduced a third actor; (3) brought out sets of plays unconnected in subject, thus being able to make a marked advance in the technical perfection of the plot in each single play. Besides technical improvements attributed to S. by his ancient biographer, some literary features may be mentioned: his increased tendency to resolve a long syllable in dialogue into two corresponding shorts; his div. of a line between two or even three speakers (*ἀντιλαβή*); his use of the apostrophe to cut off a short final vowel at the end of a verse when the next begins with a vowel; and the complexity of the plots.

The extant plays of S. are as follows: (1) *Ajax* (before 440). (2) The *Antigone* (442 or 440 B.C.). (3) The *Electra* (between 440 and 412). (4) The *Œdipus Tyrannus* or *Œdipus Rex* (produced about the beginning of the Archidamian war, 431-421), the best-known of the plays of S., and the best example of his dramatic irony. (5) The *Trachinæ* or *Women of Trachis* (perhaps between 420 and 415 B.C.). (6) The *Philoctetes* (produced, according to the scholiast, in 409). (7) *Œdipus at Colonus* (produced, according to tradition, in 401, i.e. five years after the death of Sophocles). The number of plays ascribed to S. was 130, of which 81 were brought out after his fifty-fourth year; but only the above seven are extant. Among more than 1100 fragments are some 400 lines from the *Ichnusæ*, a satyric drama, from a papyrus found at Oxyrhynchus in 1907.

Like Æschylus in his *Seven against Thebes* and the trilogy of the *Oresteia* S. is concerned with the Greek traditions of accursed families, but dwells more on the springs of action in the human heart. He refrains from putting god and man forward on the same stage, preferring to put human action in the foreground, with a divine background to justify the dispensations of mortality. In his dramas of tragic lives he is more interested in the moral qualities of his characters as manifestations of their preordained tragic fate than with the existence of this fate as a mystic superhuman agency. That S. had a style is accepted, but whether he had any pronounced or peculiar political or ethical views is uncertain, and whether they influenced his writing is still more uncertain. C. M. Bowra's view is that various phrases which seem to-day to be mere commonplaces, may have been important convictions to S. Prof. Gilbert Murray, however, thinks that modern scholars have tended far too much to treat the Greek tragedians as moral philosophers, and that in the case of S. it was dramatic,

not ethical values on which he was concentrated.

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Sophora, genus of the family Leguminosæ, including trees, shrubs, and some herbs. The leaves are pinnate, the inflorescence is in racemes or panicles of yellow, white, or blue flowers, and the pod is cylindrical and constricted between the seeds like a string of beads. Well-known species are the *S. japonica* or pagoda tree, the *S. tetralix*, a native of New Zealand, and the *S. sericea*, a N. Amer. prairie herb.

Sophoula, Themistocles (1861-1949), Greek politician, b. at Vathy, off the is. of Samos, studied at Athens and at German univs. He took part in the liberation of Samos from the Turks. He joined the Liberal party of Venizelos, and became its leader in 1936 on the latter's death. The Metaxas dictatorship was followed by German occupation, S. being put in a concentration camp. He was Premier in the 1946 provisional gov., and in Sept. 1947, when the U.S.A. insisted upon his inclusion in a coalition, he again took office.

Soprano: 1. The highest pitched voice, the usual compass being from C below treble clef to A above. 2. Vocalist with such voice; usually boys and women, also castrati in the seventeenth and eighteenth centuries. 3. The C clef on first line of stave.

Sopron (Ger *Ödenburg*), tn in Hungary, cap of the co of the same name 19 m S E by R of Wiener Neustadt situated in a wine producing dist Its chief manufs are agric implements sugar preserved fruits, etc Pop 34,000

Sopwith, Thomas Octave Murdoch (b 1888), Eng airman, yachtsman and inventor In 1910 he won the Biron de Forest £1000 prize for a flight from England to the Continent His aircraft company (founded 1911) built sev planes used in the first World War and he assisted in the development of the Hawker Company's machines the Hurricane Typhoon and Tempest in the Second World War

Sopotra, see **SOCORRA**

Sora, tn in the prov of Frosinone Italy on the Liri 36 m N W of Cassida Its chief manufs are wool and paper It has the ruins of an old castle Pop (estimated) 4,500

Sorau (Polish *Zary*), tn in Poland 60 m S E of Frankfurt on Oder It has manufs of machinery glass porcelain and textiles Coal mined Pop 20,100

Sorb, see **SERVICI FRIL**

Sorbiadonum, see **SARUM ORD**

Sorbonne, College of the, most famous of the colleges in the Univ of Paris It was founded in 1252 by Robert de Sorbon (1201-74) chaplain to Louis IX with the consent of that sainted monarch The college was devoted entirely to theology and was regulated by the strictest discipline None could enter until he had already graduated as bachelor of arts and the management of the college was in the hands of a body of thirty students the *Socii* The course of study including frequent disputations, was most thorough, and the Sorbonne rapidly rose to the highest position among the theological schools of Europe such was its reputation that difficult cases were usually sent from Rome for its decision The Sorbonne welcomed the introduction of printing but with the decay of the scholastic philosophy its fame also died away It clung to the old ideas until the revolution when its property was all confiscated On the reorganisation of the Univ of Paris in 1808, the Sorbonne became the seat of the three faculties of literature science and theology In 1823 the Univ library was moved to the S In 1818 the *École des Hautes Etudes* and in 1817 the *École des Chartes* were estab there Re construction of the buildings was completed in 1889 See hist by J Bonnet 1928

Sorcery, see **MAGIC**

Soreidae (properly *Soriceidae*), see **SIRENS**

Sorel, Charles (1597-1674) Fr novelist b in Paris remembered chiefly for his *Histoire comique de Francion* (1622) a burlesque of mawkish gallantry, and *Le Berger extravagant* (1627) The latter is in effect the *Don Quixote* of France, which describes the pastoral follies of a young Parisian bourgeois whose head has become turned by reading contemporary fashionable novels

Sorel, Georges (1847-1922), fr social philosopher, b at Cherbourg studied at

the École Polytechnique and became an engineer for the dept of bridges and highways He gave up his post in 1892, and began intensive self education He reflects the anarchist philosophy of Proudhon and Bakunin denying the belief in progress and advocating instead a 'heroic conception of life' While at the first he allied himself with Jaurès in the Dreyfus affair and later championed the syndicalist cause in the years immediately preceding the first World War he veered towards the extreme right wing nationalists of the Action Française group In his eyes the war was the 'crusade of democracy, and democratic plutocracy, and he welcomed Russian Communism and Fascism alike he chose both movements in his eyes stood for an imperialism of products It is and German Fascism borrowed from his theories the system of a corporate state and the idea of an heroic myth for the inflammation of public opinion His publs include *Le Prince de Socrate* (1883) *La position de l'Action Française* (1907) *Le rôle de la violence* (1908-1936) (Eng trans. T. E. Hulme 1916) *Les illusions du progrès* (1910) *Matériaux pour une théorie du prolétariat* (1919-1929) *De l'utilité du pragmatisme* (1921-1928) and *De l'histoire* (1933) See lives and studies by E. Leone 1923 G. Pirou 1927 P. L. Sarrre 1928 M. Freund 1932 F. Vuit 1936 and V. Sartre 1937

Sorel, cap of Richelieu co Quebec Canada 45 m N E of Montreal on the St Lawrence R founded in 1663 Its chief manufs are agric implements machinery, bricks and leather It is also engaged in shipbuilding Pop 12,000

Soresina, tn of Lombardy Italy the chief manuf is silk Pop 12,000

Sore Throat, term used for many varied conditions characterised by pain in the region of the uvula tonsils pharynx and larynx Catarrh of the fauces the region bounded by the soft palate uvula and tonsils is micro organismal in origin It is usually associated with catching cold and is sometimes symptomatic of acute fevers as diphtheria and scarlet fever A swab should be taken and cultures made from it in any doubtful case Chronic inflammation of the mucous membrane of the fauces is known as relaxed throat When the seat of the catarrh is in the tonsils (7 p) the condition is known as tonsillitis Quinsy is characterised by a tendency to suppuration The larynx is very commonly the seat of inflammation producing hoarseness tickling and other unpleasant sensations Acute laryngitis is due to 'catching cold' or the inhalation of irritating substances or may be an extension of inflammation from the nasal or the bronchial mucous membrane 'Clergymans sore throat' and 'habacothroat' are chronic forms of laryngitis due to the constant irritation caused by excessive use of the voice or inhalation of tobacco smoke See **LARYNGITIS**

Sorghum, genus of *Andropogoneae* tropical and subtropical Gramineae indigenous to Africa, where it is the leading

cereal grain. It is also important in India, N. China, and U.S.A., and is grown also in S. Europe. There are hundreds of varieties, which apparently are not classified as species. See further under MILLET and also under DOURA, or DURRA.

Soria: 1. Prov. of N. Spain in the Douro basin. Lumbering, charcoal-burning, and the production of salt and asphalt are carried on. Area 3977 sq. m. Pop. 160,400. 2. Cap. of the above, on the r. b. of the Douro, with sev. fine specimens of Early Romanesque work, a ruined citadel, etc. The anct. Numantia was 3 m. to the N. Leather, linen, flour, pottery, and chocolate are produced. Pop. 12,500.

Soriano, dept. of Uruguay, bounded by the Uruguay and Rio Negro. The tn. of the same name at the confluence of those rvs. was founded in 1624. Mercedes is the cap. Area of dept. 3561 sq. m. Pop. 93,500.

Soriidae, see SHREW.

Sorley, William Ritchie (1855-1935), Brit. philosopher and theologian, b. at Selkirk. He was educated at a private school at Birkenhead, Edinburgh Univ., and Tübingen. Regius prof. of moral philosophy at Aberdeen Univ. (1894-1900) and was appointed to the Knightbridge chair of moral philosophy at Cambridge, which he held until his resignation in 1933. In his philosophy and theology he was a theist, holding that moral values are objective and not constituted by feeling or desire. His works include *The Ethics of Naturalism* (1885); *Recent Tendencies in Ethics* (1901); *The Interpretation of Evolution* (1910); *The Moral Life* (1911); *Moral Values and the Idea of God* (being his Gifford lectures at Aberdeen 1914-15) (1918); and *A History of English Philosophy* (1920).

Soroca, or **Soroki**, tn. in Bessarabia, Rumania, on the Dniester, the centre of a wine-producing dist. Pop. 30,000.

Sorocaba, tn. of Brazil, in the state of São Paulo, 68 m. W. of São Paulo city. One of the leading industrial tns. of the country, with hydro-electric power, it has cotton and silk spinning mills, and manufs. cement, hats, footwear, alcohol, and fertilisers; there are also railway workshops, printing works, and electric power plants. Cotton and oranges are grown in the vicinity, and other products are sugar, coffee, and timber. Pop. 48,000.

Sororities, women's organisations in imitation of the men's national fraternities (q.v.) to be found in nearly all important Amer. colleges and univs. Like the fraternities they are organised in chapters, with small executive councils, have distinctive badges and symbolic insignia, but, unlike the fraternities, have a secret initiation ritual. The first Gk.-letter sorority, the Kappa Alpha Theta (in imitation of the national society of Phi Beta Kappa), estab. at De Pauw Univ., has over 1000 chapters. The S. issue quarterly magazines and bulletins of various kinds.

Soron, tn. in the United Provs., India, 53 m. S.W. of Bareilly. It is a pilgrim resort. Pop. 13,000.

Sorrel, term applied to many plants of different genera characterised by an acid taste which is often not unpleasant. Sev.

of these belong to the polygonaceous genus *Rumex*, as *R. lunaria*, the tree-S., *R. acetosa*, the S.-dock, and *R. scutellatus*, the Fr. S. The tree S. is a Canary Is. species; Eng. species are the common S. (*R. acetosa*) and the sheep's-S. (*R. acetosella*). The climbing S. of tropical America is *Begonia scandens*, and the wood S. are species of *Oxalis*.

Sorrel-tree, name applied to sev. different plants, including *Andromeda arborea* (or *Orydendrum arborum*), a species of Ericaceae, and *Ithibiscus heterophyllus*, a species of Malvaceae, known as the Queensland sorrel.

Sorrento, tn. and tourist resort of Italy, in the prov. of Naples. It has trade in silk and wine. It has Rom. ruins; Tasso was a native. Wine is produced, for which, and for fish, and red vases, the tn. was long famous. Pop. 7500.

Sorsogon: 1. Prov. of S. Luzon, Philippines. It is traversed by a wooded mt. range, culminating in the volcano of Bulusan. Area 675 sq. m. Pop. 140,000. 2. Cap. of the prov. of S. at the head of S. Bay.

Sör-Tröndelag, is. of Norway, in the N.W., between Sweden and Trondheimsfjord, a generally wooded area. Agriculture and lumbering industries are carried on. Cap. Trondheim (Trondheim). Area 7241 sq. m. Pop. 192,200.

Sorus, see FERN.

Sosnowiec, tn. in Silesia, Poland, 7 m. E. of Katowice. Its chief industries are the manuf. of iron and steel ware, cotton, and chemicals. Pop. 130,000.

Sostomagus, see CASTELNAUDARY.

Sotavento, *Islas de*, see LEEWARD ISLANDS.

Soteriology, branch of theology which deals with the salvation of mankind by Jesus Christ. See ATONEMENT.

Sotheby's, Eng. firm of auctioneers of works of art and books, founded by Samuel Baker, who held his first sale in 1741 and estab. the first book auction room in England in York Street, Covent Garden, in 1754. The firm is now Sotheby & Company, of 34-35 New Bond Street, London, W.1. Among the libraries and collections sold at S.'s have been those of Dr. R. Mead (1754), John Wilkes, the Republican (1764), Talleyrand (1793), Heber (1834), Beckford (1832), Sir Thomas Phillipps, Lord Ashburnham (1897-98), Amherst (1908-9), Pembroke (1914-20), and Crysfort (1923); the Britwell, Huth, and Yates-Thompson libraries, which realised together £1,100,000; and since the war the Dyson-Perrins (£150,000) and Landau (£106,000) libraries and the Eckstein art collection (£223,000).

Sothic Period, anc. Egyptian chronology, was 1461 years; being the period in which the year of 365 days circled through all the seasons in succession.

Sothic Year, Egyptian year of 365 days and 6 hrs.; so called from Sothis, the dog-star, at whose heliacal rising it was supposed to commence.

Soto, Fernando de (1496-1542), Sp. explorer, b. at Jerez de los Caballeros, Estremadura, voyaged to Darien in 1519, under Davila, and joined the expedition of

Nicaragua in 1527. During the conquest of Peru, in which he seconded Pizarro, he was so fortunate and came home with so much wealth ('an hundred and four score thou and ducats') that the Emperor Charles V suffered him to embark at his own expense on the subjugation of Florida. Set out in 1539 from Tampa Bay in search of El Dorado. In 1541 he discovered the great Mississippi and crossed over to the Washita R. but his companions were decimated by disease and continual skirmishes with the Indians and all the clues to the source of the treasure provided elusive. In 1542 he died of fever and disappointment and the remnant of his expedition eventually reached Mexico. See life by R. B. Cunningham Graham (1903) and I. Maynard *De Soto and the Conquistadores* 1930.

Sotteville-les-Rouen, tn in the dept of Seine Inférieure, France, a suburb of Rouen. Pop. 15,500.

Soudan, see **SUDAN**.

Souffrière, common name for a volcano in the W. Indies. See under **ST VINCENT**.

Soul (Gk ψυχή *psuchē* 'soul') term used in four slightly differing senses: (1) the primitive idea of the S is that of a shadowy image of the body or as some very intangible idea. It is then identified with the breath. (2) in later Gk and Christian philosophy it denotes the immaterial part of man, the seat of intelligence, personality and will. (3) it is also used by psychologists in a wider sense to denote the whole of the 'consciousness' of an individual. (4) Lastly late Jewish and some Christian thinkers seem to favour a div. of the immaterial part of man into two divs, S and spirit, of which the S is the lower and includes the intelligence. In this sense the word S is often used as equivalent to mind. In the hist. of Gk thought there are indications of an understanding of the S in Anaxagoras and Socrates. Plato was influenced much by the latter's clear div. of the ideal from the sensible world and he seems to have conceived of the S which could perceive the immaterial as being itself immaterial in some ways. Neither he nor Aristotle however can be said to have believed in the personal immortality of the S. When Gk thought would Christian revelation a considerable advance was made, and the whole subject is well treated by St Augustine in his *De Trinitate* where he anticipates Descartes in many of his conclusions. According to Aquinas the S is the form or characterising principle of each living thing. The human S is a spirit and exercises also spiritual functions but this does not imply any real div. into two parts. See also **RELIGION**. See A. Voinet *The Human Soul* 1913 and M. de Wulf *Scholastic Philosophy* (Eng. trans.) 1907.

Soult, Nicolas Jean de Dieu (1769-1851), Duke of Dalmatia and marshal of France, b. at Saint Amans la Bastide (Tarn). His father a notary, died before his education was complete so he was obliged to join the fr. Army as a private (1785). His promotion was rapid. In 1792 he was adjutant-general and after

displaying remarkable coolness at Fleurus he gained the brevet of general of brigade (1794). He fought with great distinction under Masséna in Switzerland, and in 1804 was appointed by Napoleon a marshal of France and after the Russian campaign (1806-7) was given a dukedom. He then commanded in Spain and Portugal and after his defeats at Orunna (1809), Albuera (1811) and Salamanca (1812), and a quarrel with Joseph Bonaparte demanded his recall but reassumed command in 1815 first in Spain and then in France where he displayed brilliant generalship in pitting his raw recruits against Wellington's veterans. During Louis XVIII's brief triumph he turned Royalist but declared for Napoleon in 1815 and after Waterloo was banished till 1819. He was present as fr. ambas. at the coronation of Queen Victoria (1839). He was twice minister for war under Louis Philippe and was Premier for a brief period in 1832. His *Mémoires* appeared in 1851. See also by A. de Crozeber 1851. A. Combes 1869. C. Bloch 1902. and J. B. Dumas *Neuf mois de campagnes à la suite du Maréchal Soult* 1813-14 1907.

Sound, term used to denote both the sensation received by means of the ears and the external disturbance that causes this sensation. Every body such as a violin string, a tuning fork, vocal cords etc. that emits S is vibrating. The vibrations are communicated to the surrounding medium and are propagated in the form of waves. These waves strike the tympanum or drum of the ear and cause it to vibrate, in this way the sensation of S is produced. The way in which the waves of S are propagated may be seen by considering the following simple

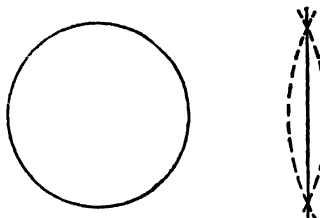


FIG 1 SOUNDING FLAT OR SIMILAR GONG

Left front view right side view

example. Fig 1 shows a sounding plate or simple gong. It is set vibrating by striking it in the centre. The side view of the plate shows in exaggerated fashion the limits within which the plate vibrates to and fro. As the plate moves towards the observer it compresses the layer of air in contact with it. This layer of air compresses the next adjacent layer, and the compression travels towards the observer where it finally pushes the eardrum inwards. The plate subsequently returns to its original position of equilibrium and moves onwards away from the observer. In this way the layer of air next to the

plate is rarefied; the successive layers of air between the plate and the observer are rarefied in turn, and finally the wave of rarefaction reaches the ear-drum, which now moves outwards. In this way the ear-drum is caused to vibrate to and fro, making one complete vibration to one complete vibration of the plate. The sensation of S. is not produced unless the ear-drum is caused to vibrate about fifty times a second, when a deep booming S. is heard. For a vibration of frequency 261

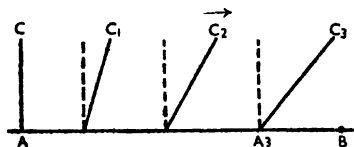
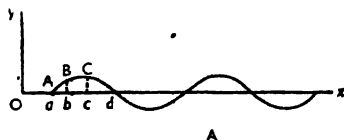


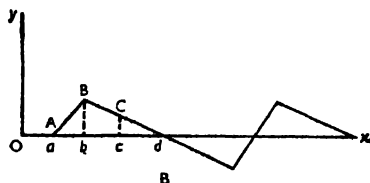
FIG. 2. EFFECT OF WIND ON SOUND
The arrow indicates the direction of wind and sound

times per sec. the S. called *middle C* is heard. If the frequency of vibration exceeds about 24,000 per sec. the note is above the range of audibility. This range decreases somewhat with increasing age of the human being. S. waves are *longitudinal*, i.e. the vibrations of the medium through which the waves are propagated take place in the direction in which the waves are travelling. Boyle (*q.v.*) was the first scientist to demonstrate that S. cannot travel through a vacuum, and his experiment may be repeated by suspending a vibrating electric bell inside a bell jar from which the air is gradually exhausted by means of an air pump. The



A

A, vibrations of tuning-fork



B

B, vibrations of violin string.

S. of the bell ultimately vanishes, but when the air is readmitted the S. is heard again. The velocity with which S. travels in air at ordinary temps. is about 1100 ft. per sec., or 750 m.p.h., while its velocity in water is about 4700 ft. per sec.; in solids the velocity with which S. travels is considerably greater than its velocity in air or liquids. Laplace (*q.v.*) first showed that the velocity of S. in a gas was given by the

equation $V = \sqrt{\frac{\gamma p}{d}}$, where p is the pres-

sure of the gas, d its density, and γ the ratio of the specific heat (*q.v.*) of the gas at constant pressure to its specific heat at constant volume. For air and other diatomic gases γ has the value 1.41; for

monatomic gases $\gamma = 1.67$. The velocity of S. in a solid vibrating longitudinally is

given by the equation $V = \sqrt{\frac{Y}{d}}$, where Y

is Young's modulus of elasticity for the solid. Since the pressure of a gas is directly proportional to its density, it follows from the above equation that the velocity of S. in a gas is independent of the pressure of the gas. The velocity varies, however, with the temp.; for a perfect gas as the square root of its absolute temp. Thus S. travels faster in warm air than in cold air, and this results in a refraction or bending of the waves in air, whose strata are at different temps. Refraction of S. also takes place when there is a wind blowing, and as a result S. carries better with the wind than against it. Fig. 2 explains how this happens. Supposing a person at A is shouting to one at B. The direction of the wind is indicated in the figure. The friction between the air and the ground causes the wind to travel more slowly near the ground than in the layer of air above it. The wave front AC therefore would gradually become bent to A₃C₃. Thus the S. is 'concentrated' by the refraction and B's ear-drum is set vibrating more violently than it would be if the air were still.

Loudness, Pitch, and Quality.—Our sensations of S. possess the three characteristics of loudness, pitch, and quality. Common observation shows that the loudness of a note depends only on the amplitude or extent of the vibration of the sounding body. Thus, for example, the loudness of a note sounded on a piano can be decreased by damping down the vibrations by means of a piece of hair controlled by a pedal. In the same

way the apparent loudness of a source of S. diminishes as the observer moves further away from it. The pitch of a note is governed solely by the frequency with which the sounding body vibrates. This was first demonstrated by Savart by means of a revolving toothed wheel. He pressed a card against the teeth of the wheel, and in this way the card was tapped by each tooth as the wheel revolved. The pitch of the note emitted by the vibrating card was found to rise with the speed of revolution of the wheel. Savart showed further that any two notes form an octave if the ratio of their frequencies is as 2 : 1. The musical intervals known as the fifth, third, etc., are formed by any two notes whose frequencies are in the ratio of

3 : 2, 5 : 4, etc., respectively. The eight notes that comprise the *diatonic scale* of modern music are given below with their frequency ratios reduced to their simplest terms.

C	D	E	F	G	A	B	c
24	27	30	32	36	40	45	48

The actual frequency of any note in the scale may be calculated from this table, since the actual frequency of C is 261 per sec.

The quality of a note depends on the shape of the actual wave it creates. This shape is governed by the form of the vibrating body, the way in which it is struck, and by the sounding board on which it is mounted. Fig. 3A represents the displacements of the air created by the vibrations of a tuning fork, while Fig. 3B is a corresponding displacement diagram for the actual waves created by a violin string. These displacement diagrams are constructed in the following way. Or represents the direction in which the S is travelling. Let a, b, c, \dots be the positions of the layers of air when undisturbed. When the waves are propagated the layers will be displaced in the direction in which the S travels. Draw ab, bc, \dots , perpendicular to Or to represent the magnitude of the displacements of the respective layers. In this way is obtained a representation of the form of the wave. The differences in shape produce the differences in quality or timbre.

Vibration of Stretched Strings.—When a stretched string is plucked, a wave travels to and fro along the string with a velocity that depends on the tension of the string and the mass per unit length of the string. The frequency of vibration of the string is

given by the equation $n = \frac{1}{2l} \sqrt{\frac{T}{m}}$, where

l is the length of the string, T its tension, and m its mass per unit length. This statement can be verified experimentally by means of a *sonometer* that consists of a string mounted on a sounding-board. One end of the string is fixed, and a known weight hung from its other end determines the tension of the string. The effective length of the string can be varied by means of a wooden knife edged bridge, placed underneath the string. Different tensions are obtained by different weights, and strings of different materials can be used in order to vary the mass per unit length of the string employed. The strings are tuned to the same pitch by moving the bridge until the note emitted by the string when plucked corresponds to that of a tuning-fork or to a fixed comparison string mounted side by side with the experimental string.

The violin has four strings of different masses per unit length, and the violinist is able to adjust the pitch of any string by altering its tension. The effective length of the string is altered by moving the finger along it, and in this way the violinist is able to obtain an infinity of notes. This property of instruments of this type is responsible for a greater delicacy of musical interpretation than that obtained with

instruments like the piano, whose range of notes is fixed.

Harmonics.—If a string is plucked in the middle it vibrates as in Fig. 4A, and the note emitted is called the *gravest* or *fundamental* note of the string. If it is damped at the middle and bowed elsewhere, it vibrates as in Fig. 4B, emitting the octave of the fundamental note. Fig. 4C shows the form of the vibrating string when damped at a point one-third of its length from a fixed end. The note emitted has a frequency three times that of the fundamental note. In general, if a string is damped at a point $\frac{1}{n}$ th of its length

from a fixed end, the note emitted has a frequency n times that of the fundamental note, where n is any integer. This note is known as the $(n - 1)$ th overtone or *harmonic* of the fundamental note. Referring

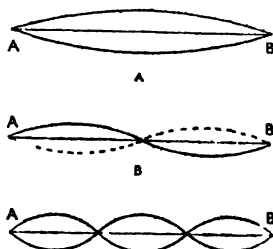


FIG. 4. HARMONICS OF A STRING. FORMS OF VIBRATION

back to the form of the vibrating violin string shown in Fig. 3B, it can be shown by a mathematical or geometrical analysis due to Fourier that the curve of Fig. 3B can be regarded as a mixture of curves like those in Fig. 4, A, B, C, etc., in other words, the note emitted by a violin string is a mixture of simple notes or *tones* whose frequencies are integral multiples of the fundamental tone, i.e. it consists of the fundamental tone and its harmonics. The relative intensities of the different harmonics depend entirely on the method of mounting a string and on the manner in which it is bowed or struck. The timbre, or quality, and the richness (or otherwise) of the note emitted, depend entirely on the mixture of the fundamental tone and its harmonics, and this determines the characteristic of the Ss. from various stringed instruments.

Pipes.—Columns of air, when vibrating, form the source of S in many musical instruments. In Fig. 5 AD is a column of air open at the end A and closed at its lower end by a column of water. The level D can be raised or lowered by means of a flexible pipe BC. If a vibrating tuning-fork is held over A, the air in AD is set into a forced vibration in a period equal to that of the fork. There are certain positions of D for which the natural period of vibration of the air column is equal to that of the fork, or a harmonic of the note

Many animals and birds can emit and detect vibrations that are inaudible to the human ear. For example, it has been shown that the capacity of a bat to avoid obstacles in its flight, without the assistance of vision is due to its use of pulses of ultrasonic radiation of frequency about 50,000 per sec. It emits about sixty of these pulses per sec when in flight, and these pulses are reflected back to it by even small objects. The bat is able to assess both the direction from which the reflected waves come, and also the interval between their emission and rearrival, it can thus estimate both the direction and distance of obstacles in its path, by means essentially similar to those used in radar (*q.v.*) except that it uses *S* waves instead of electromagnetic radiation. Ultrasonic waves in the water are similarly used in one system (Asdic) for the detection of submerged submarines, and for echo sounding.

Ultrasonics of much higher frequency (up to many millions per sec.) can be generated by use of magnetostriction or the piezo electric effect. If a bar of ferromagnetic material is magnetised (*q.v.*) by passing an electric current through a coil wound round it its length changes slightly. This is called magnetostriction, and if the bar is immersed in a liquid or gas and the current is an alternating one the movements of the ends of the bar produce waves in the fluid whose frequency is that of the length changes. If pressure is applied to a suitably cut piece of quartz or other crystal causing change of its thickness electric charges of opposite sign are produced on its faces. Conversely if charges are applied to its faces its thickness changes too. These phenomena constitute the piezo electric effect. If it is arranged that the charges are produced and removed at a frequency equal to that of the natural frequency of vibration of the quartz plate it is set into intense vibration, and it then produces ultrasonic radiation in the surrounding medium.

Because of their high frequency and short wavelength ultrasonics travel as a beam through matter without much spreading, in other words they can travel through opaque matter in much the same way as light does through transparent materials although at a much lower speed. They can therefore be used to detect flaws and cracks in such objects as steel billets, since a crack produces reflection and sets up 'shadows'. This is at present their chief industrial use, but in many others have been suggested. If sufficiently intense they can break up particles of one liquid suspended in another to produce finely dispersed suspensions (emulsions). Similarly they can be used to remove small bubbles of gas trapped in a liquid and are so used to render clear the molten material from which certain kinds of artificial gems (rubies sapphires) are made. They may find a use in removing dirt and grease in laundering, and in killing bacteria and sterilising milk.

See J. H. Poynting and J. J. Thompson, *Textbook of Physics*, vol. II, Sound 1920, Lord Rayleigh *Theory of Sound*, 1926, A.

Wood *Sound Waves and their Uses*, 1930, A. B. Wood, *A Textbook on Sound*, 1930, E. J. Holmyard and A. Barraclough *Heat, Light and Sound for Beginners*, 1931, Sir W. Bragg, *The World of Sound* 1933, and W. S. Tucker, *A University textbook of Physics* vol. II *Sound* (10th ed.) 1949.

Sound Amplification and Reproduction, see GRAMOPHONE, TALKING MACHINE, MICROPHONE, RADIO, TELEVISION, VAUDEVILLE.

Sound-films, see under CINEMATOGRAPH.

Sound-ranging, the importance of *S* was first emphasised during the First World War when it was employed to detect the positions of enemy batteries. A central station was electrically connected to each of three distant stations that it were equipped with receiving monometer microphones. The impact on the microphone of the sound waves from a gun set up fluctuations of the current in the electric circuit connecting it to the adjutants. These fluctuations were automatically recorded on a drum that revolved by clockwork by means of separate electromagnetic styles connected in series with the three microphones respectively. In this way the intervals that elapsed between the instants at which the sounds reached the three stations were recorded, and from a knowledge of the velocity of sound in air and the exact positions of the three stations the enemy battery could be located. The principle of *S* was also applied with suitable modifications by submarines in order to locate the position of a ship while it is employed by all the larger liners to day in order to measure the depth of the sea by means of timing the sound of a small depth charge to the bottom of the sea and back. For echo-sounding see *ECHO*.

Sound, The (Din Oresund), strait leading from the Cattegat to the Baltic Sea between Sweden on the E. and the Dan is of Zealand on the W. Its length is 70 m. and its narrowest breadth between Helsingør and Helsingborg 3 m. the extreme depth about fourteen fathoms. The land on both sides of the *S* belongs to Denmark and from the fifteenth century until 1557 heavy sound dues were levied on all foreign vessels passing through. The fortress of Kronborg at its entrance was taken by Nelson in 1801.

Soup, nutritious liquid food made by boiling vegetables such as carrots, peas, beans, potatoes, turnips, etc., bones and meat in stock. Clear soups are often made from gravy extracts, any solid substance having been removed. Thick soups are more nourishing and act as gastric stimulants.

Sous, see *SOS*.

Sousa, John Philip (1859-1932) American conductor, author and composer b. at Washington D.C., son of a Portuguese musician. *S*'s compositions include numerous marches *The Washington Post*, *El Capitan*, *Stars and Stripes for Ever*, *Imperial Edward*, etc. light operas *The Mystical Miss The Bride*, etc., waltzes, songs, and symphonies. He published *Nation's Patriotic*, and *Typical Airs of all Lands* (1890) the novels *The Fifth String* and *Pipetown Sandy* also the reminiscences *Marching Along* (1928).

Sousse, *see* SUSA

Souterrains, *see* UNDERGROUND DWEL-
LINGS

South Africa, The Union of, federation of four Brit colonies, dating from May 31, 1910. It forms the southernmost portion of Africa and comprises Cape Prov, Natal with Zululand, the Orange Free State and the Transvaal. It has an area of 471,917 sq m and the additional area of the former Ger protectorate of S W Africa, 322,880 sq m, is now under the administration of the gov of the U of S A. Its boundaries are, on the N, Portugal, S E Africa, N S Rhodesia, N W the Bechuanaland Protectorate and separated from the Cape by the Orange R, therefore to N and N W Bechuanaland and S W Africa. Its sea frontage extends from the Orange Delta in the Atlantic Ocean to the mouth of the Kosi R in the Indian Ocean. The coastline is little indented, the chief inlets being St Helena Bay, False Bay and Algoa Bay. There are mts running close to and parallel with the coast and in the interior there rises in terraces a great tableland, which in the High Veld of the Transvaal attains a height of 6000 ft. In the S W of Cape Prov are the famous Table Mts (3582 ft), the Great Zwartkops and the Langeberg, which run in parallel lines from W to E of the prov and the Roggeveld and Nieuwveld. Between the Zwartkops and the Nieuwveld lies the Great Karoo plateau, bounded on the E by the Nieuwberg, containing (compared to 7800 ft) the highest point in the prov. Between the Orange Free State and Basutoland and Natal are the Quathlamba or Drakensberg Mts (9111 ft). Other ranges are the Magalies and Waterberg in the Transvaal. The largest rivers are the Orange, Vaal and Limpopo, but the country is watered by a number of smaller streams. The climate in the higher parts of the country is very bracing and dry, and the atmosphere crisp and clear. In the coastal belt, particularly at Durban, it is very humid.

POPULATION—The pop of the U of S A in 1936 was 9,589,900 and in 1946 11,418,300, the latter figure comprising 2,372,700 Europeans and 9,045,600 non-Europeans (1,831,900 Bantu, 285,200 Asiatics and 978,500 others). From 1936 to 1946 the total pop showed an increase of 17.4 per cent and that of the European pop 16.5 per cent. The principal cities of the Union (in hiding suburbs) according to the number of inhab of European race by the census of 1946 are: Johannesburg 332,000; City of Cape Town 270,000; Pretoria 130,200; Durban 130,100; Port Elizabeth, 65,300; Germiston 52,600; E London, 40,100; Bloemfontein 38,300; Pietermaritzburg 27,800; Springs 25,300; Braampan 27,100; Benoni 24,400; Krugersdorp 23,500; Boksburg 20,500; Kimberley 19,100.

MINERALS—The greatest source of wealth in S A lies in the mines. Gold was first discovered in the Lydenburg and Zoutpansberg dists of the Transvaal in 1869, and the Kimberley, Du Toit's Pan and Bultfontein diamond mines were

opened in 1870. The most recent gold strike was at Odendaalsrust (qv) in the Orange Free State in 1946. There are also deposits of silver, copper, lead, coal, tin, platinum, manganese, chrome, uranium, ores, salt, and asbestos. The total value



South African Railway
PORT ELIZABETH DOCK
LOADING WOOL

of the mineral output in 1944 was over £70,300,000. Gold mining at over £52,000,000 is still the chief source of the country's mineral wealth. At the outbreak of the Second World War the diamond mines closed down. The value of the output of the other principal minerals of the Union in 1944 was: coal £8,076,000; diamonds £5,846,000; lime and limestone £1,118,000; copper £1,011,000; asbestos, £712,000; platinum £19,000; iron ore, £311,000; tin £192,000; silver £128,000; and chrome ore £122,000.

AGRICULTURE AND INDUSTRY, etc.—Before the discovery of the mines S A was mainly an agrarian country. The chief crops are maize (especially in the S Transvaal and N Orange Free State), deciduous fruit, grapes and wine (S W Cape Prov), citrus fruit (L Cape Prov, Natal, Transvaal bushveld), sugar cane (Natal coast), wheat and other winter cereals (S W Cape Prov), tobacco (S Cape Prov and Transvaal) and vegetables. Wool production is important; meat, skins, mohair, and dairy products are produced. Manufs have been stimulated by the two world wars. The principal exports are gold, wool, diamonds, jam and fruit, sugar, skins and hides, coal, wattle bark and extract, wines and asbestos. Most of the trade is done with the Brit Commonwealth and the U S A.

COMMUNICATIONS—The first railway to

be opened for traffic was a line of 2 m between Durban and Point in 1860 of 7 m of line between Cape Town and Wellington were completed in 1863. After about 1870, with the discovery of diamonds at Kimberley construction was rapid accelerated in 1886 by the discovery of gold at Witwatersrand. There were 7574 m of track by 1910 and in 1949 13 331 m. On the establishment of the union the gov. owned lines in the four provs were amalgamated into the S. African Railways and Harbour administration which also operates road and air services. The main ports are Cape Town Port Elizabeth Port London Mossel Bay and Simonstown (Cape). Durban (Natal), Walvis Bay and Luderitz Bay (S.W. Africa). An international airport for the U of S. A. at Johannesburg was planned to be completed in 1952.

EDUCATION—Higher education began in 1829 with the establishment of a S. African College at Cape Town incorporated in 1916 with the univ. of Cape Town while the univ. of the Cape of Good Hope, founded in 1873 was in 1918 succeeded by the univ. of S. A. There are nine univs. the univ. of S. A. founded in 1918 with its seat in Pretoria the univ. of Cape Town (1918) the univ. of Stellenbosch (1918) the Witwatersrand Univ. (1921) at Johannesburg the univ. of Pretoria (1930) the univ. of Natal (1949) at

Collego (1916) at Port Harb. provides natives with univ. education, while non Europeans also attend classes at the univ. of Cape Town and the Witwatersrand. The gov. intends to establish a medical school for non Europeans in Natal. School education is under prov. administration and is subsidised by the central gov. The central direction of public education (other than higher education) is exercised by the Prov. Education Dept. in each of the four provs subject to final control by the prov. administration. In Natal they are partly state schools and partly state aided. All vocational education technical and industrial is administered by the central gov. (Dept. of Education). Regular school attendance is compulsory for all children who have completed their seventh year but not their sixteenth year unless the child is engaged in a regular occupation and has already passed Standard VI.

RELIGION—At the 1916 census the persons belonging to the principal religious denominations were: (Europeans) Dutch churches 1 28 19, Anglicans 381 243, Jews 103 43, Rom. Catholics 92 45, Methodists 169 631, Presbyterians 87 90, Baptists 23 497, others 125 631, no religion 16 701. (Non Europeans) Dutch churches 379 341, Anglicans 57 197, Rom. Catholics 2 37 3, Native Separate Churches 1 089 47, Methodists 8 7869, Presbyterians 111 201, others 18 138, no religion 3 349 17.

GOVERNMENT—The U of S. A. is constituted by the South Africa Act passed by the Brit. Parliament in Sept. 1900. The gov. is administered by a governor general with a salary of £10 000 appointed by the sovereign. He is advised by an executive council the members of which are nominated by him. The control and administration of native affairs are vested in the governor in council. The Cabinet consists of the Prime Minister and eleven other ministers. The legislative power is vested in a Parliament consisting of the sovereign (represented by the governor general) a Senate and a House of Assembly.

The governor has power to dismiss ministers and to summon prorogue and dissolve Parliament either both Houses simultaneously or the House of Assembly alone. The Senate consists of forty members of which thirty two are elected (eight for each prov.) and eight are appointed by the governor general in council (four being specially chosen for their knowledge of native and Asiatic affairs). Of the eight elected for each prov. four are elected by the native population under the provisions of the Representation of Natives Act No. 1 of 1936. Election is carried out according to the system of proportional representation with the single transferable vote by the members of the House of Assembly and of the Prov. Council for each prov. sitting together and presided over by the administrator. The first election of members under the Representation of Natives Act was held in 1937 and the members so elected hold their seats for five years. Originally nominated senators held their



South African Railways

RONDE BOSCH CAPE TOWN

The university of Cape Town set on the mountain slope above the suburb of Rondebosch with Devil's Peak in the background.

Pietermaritzburg the Rhodes Univ. (1950) at Grahamstown the univ. of the Orange Free State (1950) at Bloemfontein and the univ. of Potchefstroom (1950). The univ. of S. A. is a federal unit and today largely extra mural. The S. A. Native

seats for ten years, but that provision of the Constitutional Act was amended in 1926, and nominated senators vacate their seats on a dissolution or upon a change of gov. The House of Assembly consists of 153 members elected as follows: the Cape fifty-five, Natal, sixteen, Orange Free State, thirteen and Transvaal sixty-six. Under the Act of 1936 Cape native voters are entitled to elect three members of the Assembly, who hold their seats for five years notwithstanding any dissolution. Members of both Houses must be nationals of European descent. Female franchise was introduced by an Act of 1930. Upon the formation of the union the colonies so united became parts of the colonial legislatures were abolished and elected provincial councils with specific powers set up. At the head of each provincial executive is an administrator chosen by the central gov. for five years, assisted by a committee of four elected by the council to deal with elementary education, agriculture, municipal institutions, etc. A provincial council may pass ordinances which must receive the assent of the governor general in council, and it may levy local taxation.

DEFENCE—Since Dec. 1921 the union gov. has undertaken the military defence of the U. of S. A. Under the South African Defence Act 1912 (as amended in 1922 and 1932) every citizen between the ages of seventeen and sixty is liable to render personal service in time of war and those between seventeen and twenty-five are liable to undergo a prescribed peace training of four years, but the Act provides that only half the total number liable to peace training will in fact undergo that training unless Parliament makes financial provision for the training of a greater number. The personnel of the S. African fighting forces during the Second World War amounted in all to more than 250,000 all ranks, including 38,000 in the S. African Air Force and 40,000 in the S. African Naval forces, while women's services and non-European services amounted for 15,000 and 90,000 respectively.

HISTORY—The history of S. A. dates back to the late sixties of the nineteenth century, at a time when the discoveries of diamonds and gold gave promise of great industrial and commercial prosperity for the country. In 1871 the year in which responsible gov. was granted to Cape Colony, Lord Carnarvon as secretary of state for the colonies initiated a scheme for S. A. similar to that established in Canada in 1867-73. At the time there was considerable disaffection among the Boers of the Transvaal. The Kimberley diamond mines, the railways, the respective rights of the Boer and the Englishman were all matters of disagreement and the country was further harassed by wars with the Bantu. It was hoped that these matters would be settled by the confederation of the British colonies and the Dutch republics, but the suggestion of a union was not popular in the Cape Parliament where it was felt that it should have originated in S. A., not in England in order to meet with success.

The proposals were also rejected in the Volksraad but, nevertheless, the first annexation of the Transvaal took place in 1877. This resulted in open hostilities, the proclamation of the Transvaal Republic (1880), and the defeat of the British troops at Majuba Hill (1881). By the convention of 1881 self-government was granted to the Transvaal. The success of the Boers quickened their racial pride, and from this time there began the struggle for supremacy in S. A. between the Dutch and the Brit. The election of Paul Kruger in 1883 to the presidency of the Transvaal had a great influence on the future history of the country. Kruger was openly hostile to the 'Uitlanders' and revised the franchise so that the new settlers of Brit and Amer extraction, though heavily taxed, should have little chance of sharing in the full rights and privileges of citizenship. Accordingly in opposition to those who demanded 'Africa for the Afrikaners' there grew up an imperialist party largely through the influence of Cecil Rhodes. Affairs in the Transvaal were reaching a crisis. By further restrictions of the franchise (1890-1894) it was practically impossible for Uitlanders to have even municipal power, and yet they provided more than half the state revenue. Petitions were made to the Brit. Parliament with a view to securing equal rights for all white races in the Transvaal, but the Volksraad remained obdurate. The Uitlanders obtaining no redress by constitutional methods, had resort to arms. The 'Jameson Raid', an attack by an armed force belonging to the chartered company and commanded by Dr. Jameson, ended in a forced surrender. This plot embittered the already unfriendly feeling between Dutch and Eng. Kruger entered into a union with the Orange Free State and worked for a united S. A. under a Dutch Republic flag (1897). In the same year Sir Alfred (later Viscount) Milner was sent out to the Cape as the new high commissioner. The murder of an Englishman named Edgar by a Boer policeman, which was lightly passed over in court, brought matters to a head. A petition with over 21,000 signatures was handed to Lord Milner who in a cable to Joseph Chamberlain, colonial secretary, advised intervention. The Boers, apparently anxious for a trial of strength, handed in an ultimatum to the Brit. agent at Pretoria in 1899.

The Orange Free State threw in its lot with the Transvaal and Natal was invaded by Boers in Oct. In that month they occupied Roboet and Jagers and forced Gen. Buller to retire from Mafeking Hill. Gen. Buller defeated Gen. Koch at Mafeking and Sir George White drove back the invaders from Mafeking. At the battle of Lombard's Kop 850 Brit. surrendered at Nicholson's Nek and in the beginning of Nov. the Boers laid siege to Ladysmith, which White held for four months. Meanwhile Kimberley and Mafeking were also besieged, the former being held by Col. Kekewich and the latter by Col. Buller. Powell's Brit. troops landed at Durban and Cape Town and marched

inland in three bodies, one under Buller to the relief of Ladysmith, Methuen to Kimberley, and Gatacre towards Colesberg. Before Christmas the Brit met with repeated disasters. Gatacre was repulsed at Stormberg, Methuen after successful engagements at Belmont and Graspan met with disaster at Modder R. and at Magersfontein where Gen Wauchope in command of the Highland Brigade fell with many of his men. On Dec 15 Buller lost 1000 men and 8 guns at Colenso. The news of these repeated disasters made a profound impression in England. On Dec 18 Lord Roberts was appointed commander in chief in S. A. with Lord Kitchener as chief of his staff. The colonies came forward with offers of help and yeoman and volunteer corps were speedily formed.

At the beginning of Jan the Boers made an attack on Ladysmith but were repulsed and engaged in an indecisive battle with Buller at Spion Kop. Lord Roberts on his arrival (Jan 10) changed the tactics. It was impossible to outmanoeuvre the Boers who were hidden behind trenches and in rifle pits by frontal attacks, and accordingly Roberts resolved to attack them on the flanks. After consultation with his chief French made a dash for Kimberley while McDougal held Cronje's attention by an attack on the right. Kimberley was relieved on Feb 15 and Cronje retreating towards Bloemfontein was overtaken at Paardeberg, near the Modder R. by Gen Kelly Kenny, and surrendered to Roberts with 4000 men on Feb 27. On the same day the Boers were forced to evacuate Colesberg and on the 28th Buller relieved Ladysmith. Roberts entered Bloemfontein on March 13. Meanwhile Kruger's overtures for peace on the basis of a recognition of the independence of the two republics were rejected by the Brit Gov. Buller continued his operations in Natal and succeeded in driving the Boers out of that prov. The garrison at Mafeking which had bravely held out on semi-starvation diet since Oct 16, was relieved by Col Mahon on May 4. Lord Roberts remained in Bloemfontein for six weeks making secure his line of communication and was harassed continuously on all sides by De Wet. That general laid a successful ambush at Sanna's Post and at Reddersburg and thus captured 1200 men and seven guns in one week. Roberts began his march on the cup of the Transvaal on May 3, took Johannesburg on May 30 and entered Pretoria on June 5.

It might have been expected that the war would end with the capture of Pretoria, but it dragged on for two years largely owing to the increasing activity of De Wet. In Dec Roberts returned to England, leaving Kitchener in command. Kruger had already made good his escape to Europe. Kitchener devised a plan of exhausting De Wet and establishing block-houses along the railway lines so that armoured trains might bring help quickly when called for. By this means the power of De Wet was gradually broken.

On April 9 1902, Boer peace delegates

met at Klerksdorp, and a peace conference was opened at Vereeniging on May 15 the terms of treaty being signed at Pretoria on May 31. Thus the republics of the Transvaal and Orange Free State were annexed to the Brit Empire. Lord Milner was left at Cape Town as high commissioner to administer the affairs of the new colonies. In order to meet the demands of labour in the mines he imported many thousands of Chinese coolies (1901). His action was severely criticised in some quarters and gave the Liberal party the election cry of 'Chinese slavery' in 1905. At the instigation of Alfred Lyttelton a new constitution was given to the Transvaal and Orange R. Colony on a more representative system to secure equal rights for Dutch and Brit. The Liberal Gov. when it came into office in 1906 advocated a policy of complete trust and forthwith instituted self government in the new colonies. A movement for closer union resulted in the establishment of the union. The matter was first discussed in the colonial Parliaments in 1904 and the Act of Union, known as the South Africa Act, passed the Brit Parliament in Sept 1901. The first union Cabinet was formed by Botha containing four ministers from the Cape, three from the Transvaal and two from both the Orange Free State and Natal. Conflict between Botha's imperial policy and the Afrikaner nationalism of Hertzog, his minister of justice, resulted in a split and Botha after resigning reformed his Cabinet without Hertzog (Dec 1912). The new Cabinet was faced with labour troubles both Asiatic and native. The Labour party helped to carry a Mines and Works Act (excluding non Europeans from many employments on health grounds and to extend further available employment for whites a Native Labour Act (1913) forbade both natives and Europeans to buy land in each other's areas. Natives were ejected from some farms before their own areas were extended by law. The long controversy over the rights of Indian coolies was terminated by the compromise Smuts-Gandhi Agreement. During 1913-1914 there was a series of strikes on the Rand among white and native labourers.

With the first World War racial differences in the union became accentuated. The projected campaign against Ger S.W. Africa was not favoured by many Afrikaners. Botha and Smuts were unpopular, and Maritz led a rebellion against the gov. He was joined by Beyers and De Wet. Botha declaring the former at Rustenburg Oct 27 1914 and the latter at Mushmoo valley on Nov 12, declared the rebellion at an end. He then continued the attack on S.W. Africa, and the main force of 4000 men surrendered at Tsumeb (July 9, 1915). Union losses were 113 killed and 311 wounded (see AFRICA SOUTH WEST).

In the elections of Oct 1915 Hertzog's followers came in as a strong opposition anti-war party, called Nationalist, while Botha's S. African party were dependent for a majority on Sir Thomas Smart's Unionist (Brit.) party. In 1917 despite the Nationalist cry of republicanism,

Botha refused a coalition with the Unionists and rejected conscription. In E. Africa Smuts was conducting an arduous campaign. The total enrolment of S. Africans in the war numbered 136,970, of whom 76,184 served overseas, while Bantu and other coloured troops numbered 92,837. S. African casualties were estimated at 6800 killed, of whom 4630 fell in Europe.

After the war the Nationalists demanded independence for all S. A., or even for the Orange Free State alone, basing their plea on the self-determination policy of the Allies. Botha and Smuts signed the peace treaty for the union, but on Aug. 28, 1919 Botha died at Pretoria. Smuts became Premier of an identical Cabinet. Hertzog advocated republicanism, but by

the U. of S. A. was toured by the Prince of Wales.

Throughout 1926, and not finally settled until Oct. 1927, the prin political issue was the Flag Bill, introducing a National flag. In Oct. 1926 Hertzog attended the Imperial Conference in London, at which the independence of dominion status was affirmed (see IMPERIAL CONFERENCE; INTER-IMPERIAL RELATIONS), and a year later the flag question was settled by compromise, the Union Jack and the Nationalist flag both to be flown equally. The design of the latter is three equal horizontal stripes, orange (top), white, and blue, the white stripe containing a shield, divided quarterly (1) Union Jack, (2) Old Transvaal Vierkleur, (3) Old Orange Free State flag, (4) four white stars on blue



Diamond Trading Co

DUTOITSPAN DIAMOND MINE NEAR JOHANNESBURG

The mine open pit (foreground) is 1500 ft across. In the background is the small lake, Du Toit's Pan, and beyond it to the right a view across the open veld

constitutional means, and the March election, 1920, resulted in Nationalist and S. African party gains, forty-five and twenty-one seats respectively. In the same year Lord Buxton was succeeded as governor-general by Prince Arthur of Connaught. Smuts made overtures to the Nationalists, but negotiations broke down over republicanism. The S. African party then united with the Unionists, and Smuts appealed to the country. In the 1921 election the new S. African party was returned with seventy-nine seats, while Nationalists had forty-five and Labour nine. Labour troubles led to a general strike, declared on Jan. 8, 1922, and this developed into an organised rebellion. Politically the gov. was weakened by a working agreement between Hertzog and Creswell, leaders of the Nationalist and Labour parties respectively. In the 1924 election Smuts's gov. was defeated. A new Cabinet was formed with Hertzog as Premier, and Parliament was opened on July 25 by the new governor-general, the earl of Athlone. The following year was comparatively peaceful in industry, and

field. Hertzog's native policy was to strengthen the colour bar, and legislation was carried through to that effect. The Labour party split, and their pact supporting the gov. was endangered, but in the 1929 elections Hertzog's ministry was unexpectedly renewed (Nationalists seventy-eight seats, S. African party, sixty-one, Creswellite Labour, five, National Council Labour, three, and Independent, one). Native disturbances in June caused the Premier to modify his native policy, and, standing by the 1926 decisions with regard to dominion status, he opposed a recrudescence of republicanism. In 1930 the earl of Athlone was succeeded as governor-general by the earl of Clarendon.

South Africa and the Gold Standard.—When Britain went off the gold standard Hertzog's gov. intended to remain on it. Theretofore his gov. had been successful in all its purposes: the flag, the language question, native affairs, and the status of Indians. It had placed a high commissioner in London with wider powers, and similar appointments were made to other

chancelleries of the world, and nations were beginning to realise that S. A. was a sovereign state. On the economy of gold, however, Hertzog's country was united indissolubly with a capitalist world. In this conjuncture Lichman Roos, ex-judge of the supreme court, emerged from retirement to demand a coalition gov. with a more elastic gold policy and no racialism. With the end of 1933 the economic collapse was disastrous. External trade came to a standstill, and the hoarding of gold and the export of capital reached such proportions that the reserve bank refused to quote exchange rates. Then at last S. A. went off the gold standard. Politicians now canvassed the possibility of an end to racialism through a combination of parties, but Gen. Smuts, while recognising the need for a change of gov., doubted the wisdom of a coalition with Roos. A month previously Smuts and Hertzog had been separated on big issues, now they exchanged compliments and a coalition Cabinet was formed, containing among others Patrick Duncan and J. H. Hofmeyr of Smuts's party, and Havengore, the Nazi sympathiser. I know of Hertzog's supporters. I say where have in Cape Town where Malin was leader of the Nationalist party. Hertzog's action was of 150 seats the Hertzog Smuts coalition won 139. Labour had only four representatives. The two leaders then declared that the coalition should be projected into a fusion of the parties under a new name, the S. African National United Party. But Malin's party demanded as the price of their support the abolition of dual nationality and the entrenchment of language rights. Malin thought it impossible for two so incompatible as Hertzog's racialism and Smuts's holism to fuse.

The Status Bills—Hertzog had given his pledge that sovereign independence would be an article of his political faith, and since that pledge was given the Statute of Westminster had been passed. It was a matter of form to establish in legislation the new status achieved by the statute, though other dominions excepting Ireland might be unwilling to do so. In 1934 Hertzog introduced the Status Bills. Other than declaring a republic he could have done nothing more calculated to alienate the Dominion party under Col. Stallard. Different parties variously interpreted both the Statute of Westminster and the Status Bills, some thinking that they emphasised the Brit. Commonwealth, others that they destroyed the executive authority of the Crown and cut every link that bound S. A. to the homeland. However, despite the criticisms of the imperialist section of political thought the Status Bills were passed. The status of the Union Act amending the South Africa Act determines that the Parliament of the union is the sovereign legislative power in and over the union to the exclusion of all Acts of Parliament of the United Kingdom passed after Dec. 11, 1931, it invests in the king or his repre-

sentative acting on the advice of union ministers, the executive government of the union, and it makes various amendments in the statutory law of internationality and naturalisation. The Royal Executive Functions and Seals Act 1934, provided for the king's Acts as head of the executive of the union, the use of royal seals and the vesting of certain functions in union officials and bodies; it does not amend the South Africa Act but amplifies the constitutional position.

South Africa's Attitude to War and Neutrality—The dangers of the Nazi revolution in Germany were now clouding the international horizon and S. A.'s position in relation to war was now discussed. Hertzog was a supporter of the League of Nations and rang his gun on the side of those powers who were ready to apply economic sanctions to Italy in the Ethiopian crisis, though during the period of partial sanctions the S. African Gov. continued to pay a subsidy to it, shipping. There was complete unanimity between Hertzog and Smuts about the right of S. A. to be neutral in war, but their views were not identical as to what would happen if Britain were attacked. As to participation in war Smuts's attitude as Aug. 6, 1938, stated in reply to Dr. Malin that the policy of the gov. was that S. A. would not automatically or in any way be involved in war, but that S. A. would only take part in a war if Parliament should so decide in the interests of S. A. But he added that he himself could not imagine that S. A. would fail to go to Great Britain's assistance for Britain was the custodian of S. A.'s independence. Hertzog maintained complete silence as to what he personally would do. The Dominion party wanted to amend the Status Bills by depriving the union of the right to remain neutral in the event of the Brit. Empire being engaged in war.

If to the outside world S. A. in 1938-39 appeared as a happy prosperous nation rejoicing in the recent celebration of the centenary of the Great Trek, it was a false picture of two peoples who were not prepared to admit that they hoped that the great tests of unity would never present themselves. In the first cabinet meeting of Sept. 2, 1933, Hertzog declared that he was going to remain neutral and under no circumstances would he allow S. A. to enter the war. For Hertzog there were five followers for Smuts and war, six. On Sept. 4 in the Assembly Hertzog repeated that S. A. would not be plunged into a war except when the circumstances of the unity itself demanded such action. But by eighty votes to sixty-six in the Prime Minister was defeated and S. A. was at war.

South Africa at War—On the outbreak of war Smuts organised in a navy, and sent it to mau Kenya's N. 1. I'det to hold any southward movement from Abyssinia by the Its. It was a self-contained force complete with armoured units and air-arm. A central and other flying schools were estab for the training of pilots. In S. African waters the union had a large

number of small craft engaged in mine-sweeping, anti-submarine work, and general patrol activities. From the start of the war the problems of armament and war equipment confronted the gov. with immense difficulties, but in harnessing her industries to wartime manufs. S. A. had sev. valuable assets, including the heavy engineering industries estab. to serve the needs of the mining industry and the railways and harbours administration, as well as plenty of electric power, a well-estab. iron and steel industry, and unlimited supplies of coal, iron, manganese, and other raw materials. The union under the political and military leadership of Gen. (from May 1941 Field-Marshal) Smuts had, by the beginning of 1941, raised an army of 120,000 men, fully armed and equipped. This force was considerably augmented in the course of the year, and it played an historic part in the Abyssinian and Libyan campaigns. The air force and the small naval force were also equipped in the union. But concentration on war supplies for their forces did not blind the gov. to the need to consider post-war problems. Both Col. Denys Reitz, deputy Prime Minister, and J. H. Hofmeyr, minister of finance, declared that the union was determined to align itself with the democracies on social and economic reconstruction.

In June 1942 disaster befell the union forces. Two brigades of the 2nd S. African Div., under Maj.-Gen. Klopper, with two composite S. African battalions and four batteries of artillery, were trapped in Tobruk and made prisoners of war by the Gers. But Springbok armoured units under Maj.-Gen. Dan Pienaar took part in the Eighth Army's (q.v.) great advance under Gen. Alexander. Early in Feb. 1943 the House of Assembly and Senate (by seventy-five to forty-nine and twenty-one to six votes) approved the Prime Minister's motion to permit union troops to serve outside the African continent. In the summer of this year the Union Defence Force had 169,000 trained European men and women volunteers, together with 50,000 volunteers on part-time service and 6000 members of the Women's Auxiliary Service working part or full time. European and non-European volunteers in 1943 totalled more than 300,000 soldiers, or tenfold the strength of the pre-war army. In 1943 at the general election the Smuts Gov. was given a vote of confidence which surprised even its most sanguine supporters; for it was a vote recorded after four years of war and in the face of bitter and relentless opposition.

In Feb.-April 1947 the royal family made a successful tour of S. A.

The 1948 Election.—In the elections of May 1948 a coalition of the Afrikaner and Nationalist parties gained a majority, albeit a very small one, and Dr. Malan became Prime Minister. The conception of *apartheid* (which may perhaps be freely trans. as 'separate development') seemed to be the basis of the Malan Gov.'s native policy. The word itself was coined on the eve of the general election, principally to rally oppo-

sition to the Liberal native policy of J. H. Hofmeyr (q.v.). Little attempt was made then to define its implications, except that it was supposed in some respects to be more moderate than *segregasie* or *segregation*. Up to the end of 1949 the process of *apartheid* had not gone far. The only definite expression of the doctrine of *apartheid* was contained in the Nationalist Gov.'s franchise proposals. These were to abolish the representation of natives in the House of Assembly, to limit their voting rights in the Senate, and to remove the Cape coloured voters from the general register, giving them instead a small number of European representatives with limited voting power. In the face of constitutional and political difficulties, however, the Malan Gov. (at least for the time being) abandoned (Dec. 1949) their attack on the non-European franchisees.

The basic problem, however, remains, of a white pop. vastly outnumbered by a black and coloured. A policy of repression, whether called segregation or *apartheid*, though popular in many quarters, was in others regarded as no permanent solution. The possibility that Communism, with its attractions for the segregated classes might take a firm hold was also clear. The new dominion of India began to take an increasing interest in the welfare of Indians in S. A. S.W. Africa was brought to the notice of the United Nations and referred to the International Court at The Hague; and a Citizenship Act was passed withholding the vote to immigrants for their first five years in S. A.

LANGUAGE AND LITERATURE: Language.—Official languages of the U. of S. A. are Eng. and Afrikaans. Afrikaans was officially recognised for all purposes by the Official Languages of the Union Act, No. 8, of 1925. It is the language into which seventeenth-century Netherlandish Dutch had developed among the Dutch-speaking people of S. A. Its differences from modern European Dutch are mainly due to a different environment and to an importation of Hottentot, Bantu, Malay, and Portuguese words into the vocabulary. Not until the nineteenth century were efforts made to elevate Afrikaans from a spoken dialect to the dignity of a written language. After individual attempts a society was founded in 1875, the *Genootskap van Regte Afrikaners*. During the S. African war the official Netherlandish was dying out as a spoken language, while Afrikaans absorbed Eng. influences. From 1905 to 1914 the movement to reintegrate Dutch S. A. by means of a national language gathered strength, and an Afrikaans literature came into existence. In 1914 Afrikaans was officially recognised for use in primary schools, a recognition extended in 1918 and made absolute in 1925. Afrikaans is now the universal form of Dutch used throughout S. A.

English Literature.—Travel literature predominates, two of the earliest books being *The Voyage to East India*, by Edward Terry, written 1622, pub. 1655, and Sir Thomas Herbert's *Travels* (1638). Notable

literary travellers of the eighteenth century were De La Caille, Le Vaillant, and the naturalists Thunberg, Sparrman and Maasson. It came the valuable work of Wm Burchell *Travels in the Interior of Southern Africa* (1822-24) followed by the writings of the missionaries Latrobe, Kircherer, and Livingstone (1813-73). Outside travel literature imaginative work was developing. The best S. African writer of the nineteenth century was Olive Schreiner (1855-1920) (*qv*). *Story of an African Farm* 1883 and *Dream Life and*

and Fang and Tyopa (1920). An outstanding book about a transport rider and his hunting dog is Sir Percy Fitzpatrick's *Jack of the Bushveld* (1907) still being reprinted. Although subtitled a *Journal of the Boer War* Denys Reitz's *Commando* (1929) is infused with a personal imaginative quality of a high order. Sensitive portrayal of the life of Afrikaans farmers is *The Little Karoo* (1925) by Pauline Smith. *A tour de force* is Alan Paton's *Cry the Beloved Country* (1949) a novel about a native priest.



THE GREAT TREE

From a painting by Jan Juta at South Africa House London

South African Railway

Real Life 1833). With regard to poetry the S. African poems of the settler Thomas Pringle (1789-1834) appeared in 1828. Other later poems of note are *Songs of the Sloop*, by J. Runcie (1903), and *The Wreck of the Grosvenor and other South African Poems*, by W. C. Scully (1860-1918) who was also a writer of stories. A later and more powerful poet is Roy Campbell (*The Flaming Terrapin*, 1923, *Adamastor*, 1930, *Collected Works*, 1949). The S. African poems of Rudyard Kipling must be mentioned, while in prose the Zulu stories of Sir Rider Haggard are well known. Other fiction writers include D. Blackburn (*b* 1857 (*Prinsloo of Prinsloordorp*, 1899)), Percival Gibbon (*b* 1879 (*The Vrouw Grobelaar's Leading Cases*, 1905)), and E. Glanville (*b* 1858 author of *Tales of the Veld* (1897) and other works, such as *Claw*

Sarah Gertrude Millin (*b* 1889) is a leading writer to-day. Apart from biographical works and social studies she has written many novels, including *Gold's Stepchildren* (1924), *Mary Glenn* (1927), *Songs of Mrs. Mab* (1931), *Three Men Die* (1934), *What Hath a Man* (1938), and *The Herr W. Schdoctor* (1941). The English writer Francis Brett Young's *The City of Gold* (1933) is a fine portrayal of the rise of Johannesburg; he also wrote *They Seek a Country* (1937). A graphic story of the Great Trek is *Turning Wheels* (1937), by Stuart Cloete who also wrote *Watch for the Dawn* (1939).

Afrikaans Literature — Afrikaans literature was insignificant before 1860, when L. H. Meurant was writing under the name of 'Klaas Waarzegger'. The first vol. of Afrikaans poetry appeared in 1861, but is

no longer extant. Influential Afrikaner writers in nineteenth-century periodicals were 'Behrend Moddermannette,' 'Trijna Snaake,' and 'Samuel Zwaartman.' In 1870 some Afrikaans poetry appeared from F. W. Reitz. The most notable names in Afrikaans literature are the poets Jan Velliers (*Die I lakte*, 1906), Totius (*By die Monument*, 1908); and Louis Leipoldt (*Oom Gert Vertel en Ander Gedigte*, 1911). C. J. Langenhoven, at whose instigation Afrikaans was first officially recognised in 1914, wrote distinguished prose in such books as *Ons Weg deur die Wereld* (1914) and *Die Opanaende Pad* (1923). Other prose writers are Léon Maré and Sangiro (A. A. Pienaar). The name of Eugene Marais is worthy of mention. Apart from his poems he wrote *The Soul van die Mier* (1933), in which he brilliantly expounds his theory of 'the soul of the white ant' to explain the highly organised society of the termite. Afrikaans critics have the highest regard for Jochum van Bruggen, among his novels being *Impe* (1924) and *Telurgesel* (1917), while *Op veld en Rande* (1920) is a series of sketches of farm life.

ART.—S. African painting extends from the flowing rock-sketches by the primitive bushmen to the large and lively school of European artists, especially in the Cape and Natal, who have filled their canvases with the sunshine and breath-taking colours of the veld, with the fascinating types of the Bantu tribes, and with the elephants and antelopes of unspoilt Africa. The pioneer of this school is Thomas Baines, who left an amazingly full record with both pen and paint brush of his fearless expeditions with such famous explorers as Livingstone and Chapman. In our own day Volschenk, with photographic accuracy, has painted veld and koppe while the blinding light of the African sun beats on them, and J. H. Pierrcoet, employing a sort of woodcut style, has captured and put on both canvas and wall not only the light-filled scenes of the bushveld, but also the strange beauty of the Witwatersrand mine-dumps. Gwelo Goodman, a popular Impressionist, painted a wide variety of Cape and Natal landscapes and studies of S. African flowers. Then there is Irma Stern, whose expressionistic studies of native folk possess undoubted merit. Two other S. African artists are Edward Wolfe and Enslin du Plessis, expatriates whose work with the London group is known in England.

Outstanding among S. African sculptors is Anton van Wouw (q.v.), whose studies of Paul Kruger, Boer types, and native tribesmen have won him wide recognition among his countrymen. See younger men are finding inspiration not only in Bantu tribal models, but also in primitive African sculpture.

In architecture S. A. is proud and fond of its early Dutch colonial style of house, with its graceful gables and wooden shutters; and Sir Herbert Baker (q.v.) and others have adapted it to present-day needs. The other definitely S. African style of architecture is a development of the native hut.

Music.—S. African music falls into three categories—the tribal songs of the Bantu, the wagon-side ditties of the Boers, and the modern compositions of S. Africans inspired by European feeling and technique. Of the latter the outstanding composer is Arnold van Wyck whose best symphonies have been played and praised in London.

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South African Company, see under RHODIA (JOHN JOHN

South African Republic, see IRANS VAAL

South African War, see SOUTH AFRICA, UNION OF *History*

Southall, bor of Middlesex, England 4 m W N W of Brentford on the main railway line to the W and on the Grand Union Canal. Industries include jam, margarine and gramophones, etc. A bridge built by Brunel carries the road over the canal and the canal over the railway line. Pop. 50 000

Southals, see SANFALS

South America (Physiography and Geology (Great Rivers (Climate Archaeology, Ethnology) S. A. is the S. portion of a continental mass lying between the Pacific and the Atlantic oceans joined to the N. portion by the isthmus of Panama, extending from lat. 12° N to 52° S. It comprises the ten republics of Brazil, Argentina, Venezuela, Colombia, Ecuador, Peru, Chile, Bolivia, Paraguay, and Uruguay, besides the European possessions of Brit., Fr. and Dutch (Surinam) Guianas (q.v.). Its area is about 7 000 000 sq. m. and the pop. 90 000 000. The extreme long arc Cape Branco 35° W and Punta Laima 81° W and the extreme lat. Punta Gallinas 121° N and Cape Horn 56° S.

Physiography and Geology—S. A. is a compact land mass and has a fairly regular coast line save in S. Chile where sunken valleys have resulted from subsidence which has left the mt. peaks as islands. The general relief of the continent consists of three areas of highlands: the Andes and the plateaus of Guiana and Brazil which are separated by the three drainage basins of the Amazon, the Plata, and the Orinoco. The highlands of Guiana and Brazil are the oldest part of the continent and geologically resemble the old plateaus of Africa, India, and W. Australia. They are composed of horizontal strata of old sandstone on crystalline rocks. Denudation has considerably worn these rocks which in some places have been completely worn away. Configuration has been greatly influenced by the work of the great rivers, and many examples of divided plateaus are seen resulting sometimes in table topped mts. while faulting has also formed similar phenomena. There is much mineral wealth deposited in these rock areas.

The Brazilian plateau is highest in the E., rising to 10 000 ft. and forming a rugged coastline with many good natural harbours among which that of Rio de Janeiro is claimed to be the most beautiful. The highlands drop to the W. by terraces to the plains of the Amazon to the Paraná and the Paraguay Rs. Deep gorge like valleys have been cut by rivers, many of which are interrupted by falls, but the Tocantins and the Paraná are navigable for a considerable distance and provide access far into the interior of the highland country. The Guiana highlands closely resemble those of Brazil, from

which they are separated by the Amazon valley. They rise to a height of 10 000 ft. and descend gradually to the coast in the N. The Sierra Pacaraima and Roraima are the highest parts and are formed of red sandstone assuming the shape of a great flat topped plateau. A further plateau area extends along the E. side of the S. Andes part of which forms the Gran Chaco (the 'great Hunting Ground'). It almost reaches the E. coast in S. Argentina where it is called Patagonia. Here it extends to the sea by a series of terraces and is traversed by such rivers as the Colorado, the Negro, and the Chubut. Lakes are formed in some of the valleys by the presence of dams of residual moraines left from the Ice Age. Much of the dist. is semi desert, comprised of shingle.

The Andes, sometimes known as the W. Cordilleras from the Sp. word for 'cord', are extensive chains of parallel fold mts. which were formed during the subsidence of the bed of the Pacific Ocean. They are new mts. as distinct from the ant. rocks and contain limestones which were deposited under deep water later than the older sandstones of the E. highlands. Unlike the highlands of Brazil the Andes show little evidence of denudation. They show signs of crustal movement due to earthquake and volcanic action. See further under ANDIS.

The formation of the great plains is due to enormous quantities of silt brought down by the great river systems. Indeed at one time these plains were the beds of wide sea areas, the sediments of rivers from the highlands having filled them.

The Great Rivers—The Amazon is the greatest river system in the world, its area being equal to that of Europe. It is navigable for ocean steamers for upwards of 2 000 m. Its chief tribes are the Tocantins, Xingu, Tapajós, Madera, Iurus, Ucayali, Negro, Yapura, Negro, and Morona. It has a huge estuary from 50 to 200 m. wide. The R. Plata (Rio de la Plata) is the estuary formed by the Paraná, the Paraguay, and the Uruguay. The Paraná is navigable for the greater part of its course, and forms the main stream. The R. Orinoco rises in the Guiana Highlands and reaches the Atlantic on the E. coast forming a great delta. It is navigable for boats of shallow draft.

Climate—The distribution of rainfall in S. A. is affected by three factors: (1) the areas of high pressure over the S. Atlantic and the S. Pacific between lat. 20° and 40°; (2) the tropical continental region of low pressure in the upper Amazon basin; (3) the direction of the ocean currents which wash both E. coasts together with a cold current which clings close to the coast along most of the W. shores on the Pacific Ocean. The summer rainfall of the continent is of a monsoon type, but differs from that of Asia in that there is no movement outward of high pressure air owing to the continent being as a whole warmer than the surrounding seas during all seasons. In winter a wide zone of drought extends across the continent from Peru through Chile and thence to Patagonia.

Archæology.—There is very little material available for the student of S. Amer. archæology, and so far scarcely any written records before the sixteenth century exist, and the number of pictorial records, such as cave drawings, etc., is negligible. From excavations an advanced level of civilisation is known to have been reached in the Andes highlands and along the coast of the Pacific Ocean in the warmer latitudes. In the forests on the lower slopes, however, conditions were very primitive. The earliest manifestations of advanced culture in S. A. reached their zenith in the fertile valleys of the Andes, where the temp. of the tropics is tempered by the elevation, the soil is fertile and water supply is constant. It is in that region that S. Amer. native culture culminated in the organised empire of the Inca (see under PERU), which the Spaniards found upon their arrival. However none of the main forms of the Inca culture (social system, government, religion, agriculture) was invented by them, being common to all the Andean tribes from Colombia to the highlands of Argentina and N. Chile. Archæological remains show that the following 'prehistoric' peoples achieved a certain level of civilisation: the Chibcha and the Quimbaya in present Colombia, the Cara, the Cadari, the Quito and the Palta in Ecuador the prehistoric pop. of Peru (q.v.). To the S. of Peru traces of ancient Inca influence are found throughout, but this influence had not gained so strong a hold as in the diets to the N. of Peru. The remains of pre-Columbian culture in the region to the S. of Peru are assigned to the tribes known as Calchaqui or Diaguita, from the name of the tribe, who were a bold and warlike people and successfully resisted the attacks of the Inca, and, in later times, were prominent in their determined resistance to the Spaniards. Culturally, their archæological remains show clear relationship with the pre-Inca culture of Peru, Bolivia, Colombia, and with the culture of the Pueblos in N. America. The area of the Calchaqui culture comprises the S. portion of Jujuy, Salta, Catamarca, W. Tucuman, Rioja, and San Juan.

In the region S. of Copiapo (Chile) the archæological remains show an entirely different culture. While the S. Amer. archæological remains N. of Copiapo are generally assigned to brachycephalic ('round-headed') peoples the S. archæological remains are attributed to a dolichocephalic ('long-headed') people, of Araucanian affinities, who seem to have been pushed southwards by the brachycephalic invaders. The last remnants of the prehistoric dolichocephalic people are probably about 10,000 Ona, Yahgans, and Alacaloof of Tierra del Fuego (= Fireland), the S. end of Chile and Argentina. The dolichocephalic people had no knowledge of metals, but used rough implements of stone, shell, and bone.

When and whence the two types of man (the brachycephalic and dolichocephalic) came is still an open question. Both the immigrations must have occurred at a

time so remote that the invaders brought with them no implements, no customs, and no language akin to those of any known people of Europe or Asia. Some scholars think, however, that the dolichocephalic type came from Europe via Greenland and the brachycephalic type from Asia via Behring Straits. The latter gradually drove the early pop. from the E. half of the continent into the inhospitable regions of the Amazon and the Tierra del Fuego.

Ethnology.—The Amer. Indian peoples, which are on their way to complete extinction in N. America, are much more alive in Central and S. A. Only in four S. Amer. republics (Argentina, Chile, Uruguay, and Paraguay) most of the pop. is of European origin. In four S. Amer. republics (Colombia, Peru, Bolivia and Ecuador) the Amer. Indians and the mestizos form a majority of the pop. In the United States of Brazil there are about 50 per cent. Amerindians and many mulattoes. In Venezuela and Guiana the Negroes and the mulattoes predominate. What little evidence is available in support of the theory of the original arrival of the natives of S. America seems to bear out the contention that they came from N. America by the isthmus of Panama. According to some scholars, however, human remains from Brazil and Ecuador also reveal Melanesian and Australoid strains. Until further researches are made the question of the origins of the S. Amer. Indians must remain far from solution.

The present chief ethnological divisions of S. A. are: (1) *Colombia and Ecuador*—Here are Chibcha speaking peoples and the Yunca who speak a Mochica language. (2) *The Caribbean area*—The Carib (Bakari, Nahuqua, and many other tribes) have been known N. of the Amazon since the time of the discovery. Having met with but a feeble resistance from the Arawak, the much dreaded Carib spread rapidly over the N. part of S. A., and prevailed from the mouth of the Amazon to the lagoon of Maracibo. They even spread to the Lesser Antilles but not to the large islands. The natives found in the Bahamas were called Lucayans by the Spaniards, many Lucayans soon perished in the hard work of the mines of Hispaniola. The Tapuya or Tabuya, also known as Tiens ('ancients') are the 'aborigines' of E. Brazil, from the coast area to the Amazon. There are two main branches the W. or Gey and the E., including the Bororo. The Tupi or Tupi-Guarani (the S. Tupi called themselves Guarani, 'warriors', but some of them were Mansos, 'tame'), originally occupying the tract about the N. affluents of the La Plata, played the same part S. of the Amazon as the Carib N. of it. The migration of the aggressive Tupi tribes (Kamayura, Aucté, Omagua, Cocama, and others) along the S. Atlantic coast and along the S. bank of the Amazon, proceeded with comparative speed. Today they form the main Amerindian element in the pop. of Paraguay. The Arawak (Mehinaki, Yaulapiti, Pareasi,

and many other tribes) are to be found on the E slopes of the Cordilleras from the peninsula of Guajira to the borders of Chile and are especially numerous in L. Bolivia. Following the Amazon and Orinoco they spread over large areas of northern S. A. as far S as the region of the source of the R. Negro and N.W. of Guayaba, as well as over the whole of the W. Indies. (3) *Peru*—About 74 per cent of the whole pop. are Amerindians, mainly speaking Quechua dialects or Aymara or Colla. Physically there is a close resemblance between the Aymara and the Quechua. (4) *The Southern Grasslands and Forest*. The native pop. of this extensive area S. of 30° S. lat., including the greater part of Uruguay, Argentina and Chile belongs to various ethnological groups. A great part of the Pampicans and the tall brachycephalic Tehuelche or Patagons have been exterminated by the white pop. and now very few Amerindians survive in Argentina. In the forest lands of S. Chile it was different: the Araucans who lived in the dist. now called Araucania compact and warlike nation held their own against the Inc. Empire and for some 250 years against the Spaniards, until in 1892 a final peace treaty was signed. Today they form an important part of the Chilean republic. The Tehuelche (Lestonien) branch of the Araucans have intermingled with Patagons of the S. and Guayana from the N. and with Europeans, giving rise to the hybrid Guachos and other tribes. Other Araucan tribes the Manzaneros intermingled with Argentinian Pampicans and Aymaran Pampicans and have absorbed some of the Patagons. In Matto Grosso there is a primitive tribe called Bororo perhaps akin to the Patagons. Other primitive or rather semi-savage tribes (Toba, Mataco, and others) speak Guayana dialects. The Eugenes are the inhab. of the Is. de Tierra del Fuego are considered as the aborigines of these southernmost lands of the earth. They are slowly dying out. They are divided into three distinct groups (Ona, Yahgan or Yamana and Alacloof) each with its own language and customs. A fourth group, the Aush or K. Ona has recently died out.

Languages see SOUTH AMERICAN NATIVE LANGUAGES

For geography, products, manners, forms of gov. list etc. see articles on the rivers, provinces and states of S. A.

See T. A. Joyce *South American Archaeology*, 1912, C. R. Inoch *The Republics of Central and South America*, 1922, R. N. Whitbeck, *Economic Geography of South America*, 1928, R. Karsten *The Civilization of South American Indians*, 1926, C. W. Domville Ryfe *Modern South America*, 1931, J. E. Thompson, *Archaeology of South America*, 1938, C. R. Wiesler *The American Indian*, 1938, R. A. Humphreys, *Latin America*, 1942, W. J. Paulk, *South American Journeys*, 1944, H. T. Wilkins *Mysteries of Ancient South America*, 1946, J. Collier, *The Indians of the Americas*, 1947, A. T. Linder *The River of*

Singing Fish, 1948, and E. Lucas Bridges, *Uttermost Part of the Earth*, 1948.

South American Native Languages

These fall into four vast linguistic regions: (1) *The Chibcha or Muisca (muiscera) ceba*—'body of five extremities,' man) linguistic family, comprises languages spoken in the S. part of Central America (for the N. part see MEXICAN AND CENTRAL AMERICAN NATIVE LANGUAGES) and in the N.W. of S. America from S. Nicaragua through Costa Rica, Panama, Colombia to N. Ecuador, Cuna or Tule, a branch of the Chibha has its own pict. writing, and is spoken by some 25,000 people in the gulf of Darien (Panama). Another branch Guayana is spoken N. of the isthmus. (2) *The Caribbean Area* numerous languages and dialects are spoken by backward peoples inhabiting the tropical forests and grasslands extending from the Cordillera to the Atlantic and from the Isthmus to the Antilles. These languages belong to four main linguistic families: Arawak, Carib, Tupiza or Ibibaya and Ithi-Ithi (Guianan). The latter is the only native language of S. America which is used in newspapers and public speeches. On the Lesser Antilles the Spaniards found Carib men with Arawak wives. The explanation of the Carib men's name for the Carib language and their women another name. (3) *The Central Indian Plateau*—The Inc. Empire (see under PERU) extending from Ecuador to Chile was inhabited by Quechua speaking peoples. In the N. part of the empire lived the Chumus speaking a Mochica language, not belonging to the Quechua family. Their descendants, the Yuncas, still live along the coast from 10° to 10° S. but Quechua subdivided into various dialects is still the main native language and is spoken by nearly 4,000,000 people. (4) The native pop. of the *Southern Grasslands and Forests* including the greater part of Uruguay, Argentina and Chile belongs to three or four linguistic families comprising many languages. Of these the main are Pampican, Tehuelche or Lestonien, Araucan, Guayana and Luginan. See also under LANGUAGES, CLASSIFICATION OF LINGUISTIC FAMILIES, MEXICAN AND CENTRAL AMERICAN NATIVE LANGUAGES, NORTH AMERICAN NATIVE LANGUAGES.

South American Ostrich, see RHINOCEROS

Southampton, municipal co. and pul. bor. and seaport of Hampshire, England on a peninsula between the Test and Itchen Rrs. at the head of Southampton Water 12½ m. S.W. of Winchester. There are some interesting ruins, including a Norman house, much of the old walls, with defences such as Arundel Tower and Cathead Tower, and ruins including the Bar Gate across the main street and a few remains of the Austin Friars priory of St. Denys (1124). King John's Palace, which dates from the twelfth century is one of the most noteworthy relics of Norman domestic architecture extant. A memorial column marks the place of embarkation of the Pilgrim Fathers on

the *Mayflower* in Aug. 1620. In Winkle Street is the anct. hospital of God's House, founded in the twelfth century for the entertainment of strangers and of pilgrims going to the shrine of St. Swithin at Winchester or to Canterbury. St. Michael's (early Norman with architectural features of later date) is the oldest church in S.; its disproportionately high spire was originally a landmark (built about 1745) for navigators. Univ. College was founded in 1850 and has four halls of residence. Among grammar schools are King Edward VI. School and Taunton's School founded in 1760, both having additional new buildings. The buildings comprising the new civic centre include the municipal offices and council chamber, the law courts and police offices, and the guildhall, central and dominating feature of the centre. The extensive tn. parks of S. stretch for half a mile through the heart of the business part of the city.

The modern importance of S. is due to its magnificent natural harbour and to its docks, which can accommodate the largest liners. Railways extend to all the quays and warehouses. The Southern Railway docks extension scheme, commenced in 1927, involved the redemption of 407 ac. of tidal mudland in the bay of the It. Test, extending from the Royal Pier to Millbrook Point. The scheme also comprised a deep-water quay wall, 7000 ft. long with a depth of water of 40-45 ft., capable of accommodating simultaneously eight of the world's largest liners. The scheme included the construction of the King George V. graving dock, the largest of its kind in the world. It is 200 ft. long and 135 ft. wide at its entrance; it was built primarily for the *Queen Mary* and can take vessels up to 100,000 tons gross, and has a quay frontage for the largest vessels of 16,500 ft. A new passenger terminal building, constructed especially for the transatlantic service, is one of the finest in the world. Steamers from the port sail to all parts of the world, and 41 per cent of the total ocean passenger transport of the country is carried out at S., which is the European terminal of many mercantile marine services. S. is the chief passenger port and, after London and Liverpool, the busiest port in the United Kingdom. It is also the marine base of Brit. Overseas Airways Corporation and a terminal for flying boats. The Royal Pier, 100 ft. long, is used chiefly in connection with the passenger motor car and cargo traffic to and from the Isle of Wight. There is an airport situated at the tn.'s N.E. suburb of Swaythling. All kinds of manufactured goods are exported and, being in regular communication with 160 of the prin. ports of the world, the port handles goods of the value of over £50,000,000 annually. S. is growing in importance as a manufacturing centre, well-known makers of aircraft having factories in and around the tn. There are many shipbuilding and repair yards, which played an important part in the preparations for the invasion of Europe in the Second World War. A great new oil refinery is in course of construction at

Fawley. There are oil storage facilities, and industries include chemicals, plastics, engineering products, iron and brass goods, paints, and tobacco.

There were three stages in the growth of S. The Rom. Clausentum, now Bitterne, was on the promontory E. of the Itchen. At an early but unknown date in the Saxon or Jutish invasion a settlement, known as Hamwih, was formed on the other side of the Itchen and on the eastward side of the peninsula between Itchen and the Test. The third township, basis of the present S., was built on higher ground near the Test at some date not long before 1066. Excavation during 1946 and 1949 around the site of Hamwih yielded evidence of domestic occupation during the pre-Conquest centuries. A charter of incorporation was granted to the tn. by Henry I. It was created a co. by Henry VI. In the reigns of Edward III. and Richard II., as to-day, it was one of the chief ports of embarkation for troops engaged in foreign wars.

S. was frequently bombed during the Second World War; in all there were some fifty-seven air raids. The dock area and many municipal buildings suffered heavily, and over 3000 dwellings were destroyed or made totally uninhabitable. Sev. churches were destroyed; the anct. structure of Holy Rood, though severely damaged, has been preserved as a memorial to the men of the Merchant Navy.

Southampton, County of, see under HAMPSHIRE.

Southampton Water, inlet on the S. of England, stretching from the Solent and Spithead into Hampshire for about 11 m. (greatest breadth 2 m.). It is a first-rate harbour, the Isle of Wight forming a natural breakwater.

South Australia, state of the Commonwealth of Australia, bounded on the E. by long. 141° E., on the N. by lat. 26° S., on the W. by long. 139° E., and on the S. by the Southern Ocean. Queensland, New S. Wales, and Victoria are on its E. and W. Australia on its W. border. All the country from the 26th parallel of S. lat. to the Indian Ocean, between 129° E. and 138° E. long., was also annexed to S. A., but in 1911 was taken over by the Commonwealth. This stretch of ter. is now known as the N. Ter. The total area of S. A. is now 380,070 sq. m.

Physical Features.—There are granite outcrops at or near Kingston, Port Victor, Murray Bridge, Kangaroo Is., and elsewhere. Porphyry, syenite, granulate, diorite, and other igneous rocks are associated as dykes with the granite, and are also found traversing the stratified primary rocks. The Gawler Ranges are mainly composed of felspar porphyry. Volcanic rocks, consisting of basalt, lava, scoria, ash, etc., occur in the Mt. Gambier dist., and are of a newer age than the older tertiary limestone. Volcanic rocks also occur in the Mt. Burr Range, not far from Mt. Gambier, and on Kangaroo Is. In conjunction with nearly all the outcrops of granite, metamorphic granite, gneiss, syenite, hornblende, micaceous, and tal-

chase schists, with crystalline marble, and quartzites, and conglomerates, are often associated. The palaeozoic rocks consist of inclined beds of conglomerates, grits, quartzites, sandstones, limestones, dolomites, clay, and micaceous slates, and shales. These primary rocks, including those of igneous and aqueous origin, extend in more or less continuous ranges from Kangaroo Is. in the S. of Mt. Babbage and Mt. Norwest, a short distance S. of Lake Eyre, with a north-easterly extension to the Barrier Ranges in New S. Wales. Smaller patches occur on Yorke Peninsula, and in the Port Lincoln and Franklin Harbour dists. It is in these primary rocks that metallic minerals occur, copper, silver, lead, gold, manganese, bismuth, cobalt, nickel, and iron, in lodes and deposits. Copper is the metal which has engaged the greatest amount of attention, and large quantities of it have been obtained from such mines as the Burra, Kapunda, Moonta, Wallaroo, etc. Silver-lead has been worked, whilst manganese, bismuth, cobalt, and nickel have also been found. Gold deposits have been worked for many years at Echunga, Barossa, and other places. The prin. minerals produced are ironstone, gypsum, salt, limestone, coal, gold, and opals, and the ann. value of miner. ^{in 1913} is between £3,000,000 and £4,000,000. The larger portion of S. A. is covered by tertiary and post-tertiary deposits. Older tertiary rocks are found along the coast from the Victorian border, W. of Mt. Gambier, to Eucla, on the W. Australian boundary. They consist of coralline and shell limestones, sandstone, clay, sand, calcareous sandstones, and argillaceous limestones, rich in fossils.

The Nullarbor Plains situated in the W. between Fowler's Bay and Eucla, are composed of hard crystalline limestone. There are three ranges of mts. in the state, Mt. Lofty, the Flinders Range, and the Hummocks. The first runs from Cape Jervis in a northerly direction, and divides the waters flowing eastward into the R. Murray and lakes from those flowing westward into Gulf St. Vincent. The highest points are Mt. Lofty 2334 ft. above sea level; Lagoon Hill, 2235 ft.; Kaiserstuhl, 1973 ft.; and N. of the Burra, Mt. Cone, 2601 ft.; and Razorback, 2834 ft. The Flinders Range rises on the N.E. side of Spencer's Gulf, about 10 m. from its shore, extending for sev. hundreds of m. N. as far as Lake Blanche. The highest points are Mt. Remarkable, 3100 ft.; Mt. Brown, 3100 ft.; Mts. Arden and Serle, each about 3000 ft. The Hummocks commence near the head of St. Vincent's Gulf, and extend northward, nearly parallel with the E. coastline of Spencer's Gulf. The Gawler Range, in Port Lincoln Peninsula, is a line of rugged mts. to the S. of Lake Gardner, extending from the neighbourhood of Port Augusta towards Streaky Bay, the prin. elevation being about 2000 ft. The highest peaks are Mt. Nonning, Mt. Sturt, and Mt. Double. Stuart Range is a low range of hills to the N.W. of Lake Torrens. In the S.E. part of the state, near the borders of Victoria, are sev. isolated peaks

that were formerly volcanoes, namely, Mt. Gambier, Mt. Schänck, and Mt. McIntyre. Other prominent hills are Mt. Pisgah, Mt. Hope, and Mt. Muirhead. The chief rvs. in S. A. are the Murray, navigable from beyond Albury, in New S. Wales, emptying itself into Lake Alexandrina, whence it flows into Encounter Bay by a narrow opening called the Murray Mouth; the Barcoo or Cooper's Creek, flowing westward from Queensland; the Wakefield, flowing in a westerly direction



Agent General for South Australia

THE MURRAY RIVER AT SWAN REACH

Majestic red gums line the banks at this point, 153 miles upstream from the mouth of the river.

into the gulf of St. Vincent; the Hindmarsh and the Inman, flowing into Encounter Bay; the Gawler, running in a W.S.W. direction into the gulf of St. Vincent; and the Torrens, rising near Mt. Pleasant, flowing in a W.S.W. direction, losing itself in large, swampy reed-beds, which drain into the sea (from this riv. Adelaide partly derives its water supply), and the Onkaparinga, rising near the source of the Torrens, flowing S.W. to Gulf St. Vincent. There are sev. large lakes in the state. Lake Torrens is a vast inland salt lake, extending from 35 to 170 m. N. of Spencer's Gulf, some 80 ft. above sea level; Lake Eyre is a large salt basin, 37 ft. below sea level, N. of and divided from Lake Torrens by a range of hills, Lake Gardner is an immense salt lake to the N. of the Gawler Ranges, at an elevation of 366 ft. above sea level. Lakes Gregory,

Blanche, and Frome lie to the E of Lake Eyre, and are connected with it in wet seasons. Other salt lakes are Hawdon, Eliza George St Clair, and Robe in the S portion of the state. The freshwater lakes are Lakes Alexandrina and Albert (through the former of which the R. Murray flows). Lake Bonney on the Murray, Lake Hope in lat 28° 30' long 139° 15' and Krombein in the S portion of the prov. also a group of small lakes near Mt Gambier. The Coorong is a blackish lagoon receiving the overflow of Lake Alexandrina. The climate is very mild and healthy. The rainfall at Adelaide averages 21 in annually, most of it falling from May to Oct. It varies from 16 to 42 in on the plains and hills respectively. The mean temp is 63° the extreme range being from 33° to 111°.

Productions, Manufactures, etc.—The total area under crops in 1946-47 was 3,884,000 ac including 2,518,000 of wheat, 502,000 of barley, 252,000 of oats, and 329,000 of hay. The wheat crop was valued at £11,887,000, barley at £3,799,000 and oats at £461,000. Viti culture is important in 1946-47 58,221 ac produced over 25,000,000 gallons of wine the crop being valued at £2,075,000. Of the total area of the state (243,000,000 ac) over 149,000,000 ac are in occupation. Alienated lands (13,890,000 ac) comprise 12,153,000 sold, 134,800 under free grants, 253,900 dedicated and 1,351,000 in process of alienation under systems of deferred payment. Of the area under lease and licence (136,025,000 ac) 18,586,000 are held on perpetual lease, 114,201,000 in pastoral, and 3,236,000 on other leases. Dried raisins and currants also yield a good revenue. The prin fruits are apples, apricots, peaches, oranges, pears, and plums and there are many others. Potatoes, onions, turnips, carrots, man, golds, pumpkins, melons, tomatoes, and practically all kinds of vegetables grow well in the state. Other products in addition to root crops are tobacco, gums, chicory, flax, olive oil, and eucalyptus oil. Stock raising is a characteristic industry in 1947 there were nearly 8,000,000 sheep and over 420,000 cattle. In 1946-47 the wool clip was over 70,000,000 lb valued at over £8,500,000. In normal seasons large quantities of butter, frozen meat, bacon, etc. are exported to Europe in addition to hides and skins. Wattle bark for tanning is also an important activity. The chief industries in order of value of output in 1946-47 were metals, machines and vehicles, woollens, flour, mills, saw mills and plywood mill, electricity and gas, butter, fertilisers, cheese, non-woollen textiles, chemicals and medicines, furniture, bedding, etc., bacon, curing, tailoring, etc., breweries and footwear. In the same period the prin overseas exports, in order of value, were wool, lead, flour, wheat, barley, pig iron, meats, skins and hides, and wine. The total exports were valued at £45,512,000. Some 67 per cent of the total value was in exports to the rest of the Brit. Commonwealth (39 per cent to the United Kingdom), 8 per cent to the U.S.A., 6 per cent

to Belgium and 4 per cent to France. Imports were valued at £11,938,000 the main items being metal manufactures, textiles, bags, sacks, etc. and vehicles. The Brit. Commonwealth supplied 65 per cent in value (United Kingdom 35 per cent) and the U.S.A. 13 per cent.

Education.—Education is compulsory secular and free to the age of fourteen. There are some 130 private schools and 547 denominational secondary schools. The Univ. of Adelaide incorporated in 1874 was endowed by private munificence aided by an ann grant. It confers degrees in arts, science, medicine, law, and music. A school of mines and industry was estab. in 1889 which is supported by unparl. vote and by school fees. There are also technical schools, a school of arts and crafts and an agric. college.

Communications.—The state owns and works the railways of S.A. The gauge of the prin part of the system based on Adelaide is 5 ft 3 in whilst the N and S.L. lines are ft 6 in. Through connections to Victoria are on the broader gauge but the route via the trans-Australian line to W. Australia requires a transfer to 4 ft 8½ in at Port Lincoln Junction. There are also links on the route to New S. Wales. There are 1380 m of the broader gauge and 1067 m of the narrower. There are some 52,000 m of roads and several good harbours. Regular air passenger and mail services are in operation between Adelaide, Perth and country centres and passenger are also carried to and from other states. Inter- and water communication is effected by the Murray R. on which steamers run for 200 m. There is regular and frequent communication by mail steamers with all parts of Australia as well as with Europe and San Francisco.

Constitution.—The Parliament of S.A. consists of a Legislative Council and a House of Assembly. The Council as originally constituted consisted of thirteen members and the Assembly of thirty-six. In 1881 six members were added to the Council but in 1901 the number was reduced to eighteen. There are now twenty members, half of whom retire every three years. The House of Assembly which is liable to dissolution by the governor and is elected for three years, now consists of thirty-nine members. Voters must be twenty-one years of age and have been on the electoral roll six months besides being natural born or naturalised Brit. subjects. There is a small property qualification for electors to the Legislative Council. The franchise for both Houses was extended to adult women in 1891. Responsible gov. is carried out by six ministers members of the legislature who form the Cabinet and are ex-officio members of the Executive Council. Responsible gov. was estab. in 1856.

History.—S.A. was probably known to the Dutch in the middle of the sixteenth century, was surveyed by Tasman (qv) in 1644, and was chartered by Klinders in 1802. In 1828 Stuart explored the

Murray R. to its mouth. In 1831 Major Baron suggested the desirability of forming an Eng. settlement in the neighbourhood of the Murray R. The prov. was founded on Gibbon Wakefield's system of colonisation under an Act of 1834. The first colonists landed at Kangaroo Is., but the settlement was almost immediately transferred to the mainland, where the prov. was proclaimed at Glenelg on Dec. 28, 1836. The discovery of copper at Kapunda in 1842 and at the Burra in 1845 paved the way to prosperity.

Population.—Pop. in 1947 was 646,216. Adelaide, the chief city and cap., has a pop. of 382,600, inclusive of suburbs within 10-m. radius. Other tns. are Port Pirie (12,500), Whyalla (7500), and Port Augusta (4500) at the head of Spencer Gulf; Kapunda (1200), Gawler (1100), and Peterborough (2900) on the line from Adelaide to the N., Mt. Gambier (6800); Naracoorte (2200), and Millicent (3100) in the S.E., Port Lincoln (3900) on Eyre Peninsula, Murray Bridge (3700), Renmark (1900), and Berri (3700) on the R. Murray. The number of full-blooded aboriginals in the state is about 2700. Infantile mortality (24.27 in 1947) is one of the lowest rates in the world. At the 1947 census the persons belonging to the prin. religious communities were: Church of England, 188,200; Methodist, 170,500, and Rom. Catholics, 81,000.

See J. Blacket, *History of South Australia* (2nd ed.), 1911; A. G. Price, *The Foundation and Settlement of South Australia, 1829-45*, 1924, and *Pioneers and Founders of South Australia*, 1929; C. Kenner, *South Australia: a Geographical Study*, 1931; Royal Geographical Society of Australia, *Centenary History of South Australia*, 1936; C. T. Madigan, *Central Australia*, 1936; R. H. Linsayson, *The Red Centre: Man and Beast in the Heart of Australia* (2nd ed.), 1934, and the Ann Statistical Register.

South Bend, co. seat of St Joseph co., Indiana, U.S.A., on the St Joseph R. It contains the Rom. Catholic Univ. of Notre Dame. The chief manufs. are aircraft, motor cars, and agric. implements, and it has foundries and lumber mills. Pop. 101,300.

South Bethlehem, see BETHLEHEM (U.S.A.).

Southborough, tn. of Kent, England, 2 m. N.W. of Tunbridge Wells. Pop. 9400.

Southbridge, tn. in Worcester co., Massachusetts, U.S.A., 21 m. S.W. of Worcester. Manufs. include cotton goods, cutlery, and optical instruments. Pop. 16,800.

South Canara, see KANARA.

South Carolina, the 'Palmetto State,' one of the thirteen original states of the U.S.A., situated in the S. Atlantic div., and has an area of 31,055 sq. m. It is bounded on the N. by N. Carolina, on the S. and E. by the Atlantic Ocean, and on the S.W. by Georgia. The surface is low along the coasts, but rises inland by a series of belts to the Appalachian system, which forms the W. frontier. Over 1,000,000 ac. are swamp land, and over 6,000,000 are forest land, chiefly pine;

turpentine is an important product. The climate is sub-tropical at the coast, and varies to temperate in the W. part. The state is basically agric., the chief crops being Indian corn, wheat, oats, potatoes, hay, cotton, tobacco, peanuts, and rice. Long staple cotton grows on the salt marshes, fruit and vegetables grow on the barren pine land. Flies and pomegranates flourish in the S. and along the coast. Grapes and peaches and strawberries are abundant. S. C. is becoming heavily industrialised. Textiles form 70 per cent of the manufs.; others are paper, pulp, and allied products, clothing, and electric power. The chief mineral products are stone, clay, and clay products, sand and gravel, gold, silver, manganese, iron ore, and monazite. There are six state forests (148,000 ac.) and eighteen state parks (38,000 ac.). The cap. is Columbia (pop. 62,000), other prin. tns. are Charleston (72,000); Greenville (36,000), and Spartanburg (52,000). The Negro Baptists form the most numerous religious body. School attendance was made compulsory in 1922, and there are separate schools for white and coloured children. The Univ. of S. C. for higher instruction was founded at Columbia in 1801, and has 270 profs. and 5500 students; the Clemson agric. college, founded in 1893, has 225 profs. and 3500 students. It opened the first textile school in the U.S.A. to train technical mill workers and foremen. There are also many small colleges. The most important harbour is Charleston, which has considerable coastwise and foreign shipping. There are sev. other good harbours along the coast. S. C. has a large Negro pop. In 1880 there were nearly twice as many Negroes as white men in the state; the numbers in 1940 were 814,000 Negroes and 1,084,000 whites. There is a strict segregation policy in hospitals, railways, buses, parks, etc. Many of the Negroes are tenant farmers and cultivate the land. The pop. in 1940 was 1,898,500, and was estimated in 1945 to be 1,991,000. The first permanent settlement was made by the Eng. in 1670, and Charleston was founded in 1680. It remained under a proprietary gov. with N. Carolina until 1729, when it became a separate Crown colony. It was the scene of many battles of the revolution, and was the first state to secede, 1860. It suffered severely during this war. The S. C. General Assembly comprises a Senate of forty-six members, and a House of Representatives of 124. Two senators and six representatives are sent to Congress. See E. McCrady, *History of South Carolina*, 1902; D. D. Wallace, *History of South Carolina*, 1934; J. K. Coleman, *State Administration in South Carolina*, 1935; R. H. Taylor, *Ante-bellum South Carolina: a Social and Cultural History*, 1942; and Federal Writers' Project, *Our South Carolina: To-day from Yesterday*, 1942.

South Carolina Regiment, see under WEST INDIF. REGIMENT, THE BRITISH.

Southcott, Joanna (1750-1814), Eng. religious visionary, b. at Gittisham in Devonshire, the daughter of a farmer. About 1792 she declared herself to be the

woman of Revelation xii., and gave forth prophecies in rhyme, sev. collections of which were pub.

South Dakota, the 'Sunshine State,' or 'Coyote State,' one of the N. central states of U.S.A., bounded on the N. by N. Dakota, E. by Minnesota and Iowa, S. by Nebraska, and W. by Wyoming and Montana. Area 77,047 sq. m. The state (fifteenth in size) lies in the region of the Great Plains. The Missouri R. crosses the state, with W. tribs., Moreau, Cheyenne, and White Rs.; and E., the James and Big Sioux. Lakes Bigstone and Traverse are on the N.W. boundary. The climate is subject to extremes of heat and cold. There is much treeless prairie land, but the Missouri and James valleys are fertile, having a black sandy loam with a clay subsoil. There are 8400 sq. m. of Indian reservation. In the W.S.W. are the Black Hills, Harney Peak rising to 7242 ft. Near by are the Bad Lands (1,000,000 ac.) with prehistoric fossil deposits. Irrigation has been successfully carried out, the latest schemes being those connected with the W. tribs. of the Missouri; development of the basin of the latter for navigation, power, and irrigation is being carried on. S. D. is second only to N. Dakota in spring wheat production. Other cereals, potatoes, vegetables, and flax are grown. Pigs are of great importance. The wool-clip in 1917 totalled 7,346,000 lb. The chief manufs. of the state are meat-packing and the making of butter; others are cheese, flour, and grain milling, the making of condensed and evaporated milk, and confectionery, timber, and planing mills products. Silver and gold are mined in the Black Hills; the largest gold mine of the U.S.A. is at Lead. In order of value the prin. minerals are gold, stone, cement, sand, and gravel; others are felspar, mica, lithium, and bentonite. Education is compulsory to sixteen, and free to twenty-one. The state univ. at Vermillion was founded in 1882, and has nearly 2000 students. There are also a school of mines with 700 students, an agric. college with over 2000 students, and four normal schools. Indian schools are maintained by the state at Flandreau, Pierre, and on the reservations. Large Congressional land grants are made to state schools. The governor is elected for only two years; the Senate has thirty-five members, and the House of Representatives seventy-five. Two Senators and two Representatives are sent to Congress. The state was only admitted to union in 1889, when it was divided from N. Dakota. The cap. is Pierre (pop. 4300). Other cities are Sioux Falls (40,800); Aberdeen (17,000); Rapid City (13,800); Huron (10,800); Mitchelltown (10,600); Watertown (10,600); and Lead City (7500). Total pop. (1940) 612,900, a decrease of 50,000 since 1930. In 1948 the pop. was estimated as 623,000. Foreign-born whites in 1940 numbered 44,000. One of the most remarkable things in the state is the Rushmore National Memorial. The heads of George Washington, Jefferson, Lincoln, and Theodore Roosevelt, 60 ft. high, have been carved on the granite face of Mt.

Rushmore. See G. W. Kingsbury, *History of Dakota Territory*, 1915; A. D. Tallent, *The Black Hills*, 1923; D. Robinson, *Encyclopædia of South Dakota*, 1925; and *Brief History of South Dakota*, 1927; and Federal Writers' Project, *South Dakota Guide*, 1938.

South Devon Bred, see under SHEEP.

South Dome, see HALF DOME.

South Downs (England), see DOWNS, NORTH and SOUTH.

Southeast Island, see under LOUISIADÉ ARCHIPELAGO.

South Easton (Pennsylvania, U.S.A.), see EASTON.

Southend-on-Sea, co. and municipal bor. and seaside resort in Essex, England, at the mouth of the Thames, 36 m. E. of London, the second largest seaside bor. in the Brit. Isles. S. is one of the driest winter resorts in England, the rainfall for the five months being 8.5 in. Historic buildings include the Cluniac priory of St. Mary of Prittlewell, founded about A.D. 1110 by Robert Fitz-Swayne as a cell of the priory at Lewes, Sussex. Southchurch Hall, a thirteenth-century building, on the site of an earlier seventh-century building, was the residence of Sir Richard de Southchurch, sheriff of Essex in A.D. 1265; it is now used as a public library. St. Mary the Virgin, Prittlewell, dates from the early seventh century; the present Norman nave was erected in the eleventh century, the processional aisle in the twelfth century, and the chancel tower and Jesus chapel in the fifteenth century, which latter has a beautiful stained-glass window attributed to Albrecht Dürer, and formerly in the church of St. Ouen, Rouen.

S. has a pier nearly 1½ m. in length, and sixteen public parks, gardens, and pleasure-grounds covering over 600 ac.

Domesday Book contains references to the pars. of Prittlewell, Leigh, Shoeburyness, and Eastwood, which now comprise the area upon which S. is built. This area has been peopled from remote times. There were successive occupations by Celts, Romans, Saxons, and Danes. The pagan Saxons settled in the area from A.D. 500 to 650, and in 894 King Alfred defeated the Danes at Benfleet, driving them across the site of modern S. to Shoeburyness, where they formed a settlement. The name *Southernde*, i.e. the south end of Prittlewell, was first used in a legal document in the reign of Henry VIII. The rise of the tn. as a health resort dates from about 1794, when it became a fashionable place for sea-bathing. There are sev. industries, including plastics, radio, light engineering, textiles, furniture, boat-building, and brickmaking. Pop. 150,000.

Southern Alps, chain of mts. on the W. coast of South Is., New Zealand, culminating in Mt. Cook, 12,349 ft. high. They form a barrier to communication between E. and W. for more than 100 m., and attain an average height of 8000 ft., many exceeding 10,000 ft. A road from Christchurch to Hokitika passes through a difficult defile, called the Otira Gorge, and over Arthur's Pass, 3000 ft. high. Other mt. passes in the chain are Harper's

Pass and Haast Pass. There are several glaciers, the Tasman being the largest, and lakes of glacial origin. See A. P. Harper, *Pioneer Work in the Alps of New Zealand* 1896.

Southern Continent, see TERRA AUSTRALIS INCOGNITA.

Southern Cross, or **Crux**, remarkable constellation in the path of the Milky Way about 30° from the S. celestial pole, contains twelve stars visible to the naked eye besides many other faint stars. Its three brightest stars Alpha Beta and Gamma are of magnitude 1.1, 1.2 and 1.6 respectively. In Ptolemy's catalogue Crux was considered to be part of the constellation Centaurus. Beta Crucis was the first star of the helium type in which the presence of oxygen was recognised, this discovery being made by I. M. Clean in 1897.

Southernden, Elizabeth, see BUTLER JADY.

Southern Dialect, see under ENGLISH LANGUAGE Middle English.

Southern Pacific Company. One of the leading railroad companies in the U.S.A. organized in Kentucky in 1881. The company operates 8174 m. of track wholly in the W. dist. of Amer. railways. Of this mileage 8027 is entirely owned by the S. P. R. or its subsidiaries. The companies the chief of which are the Central Pacific (2174 m.) and the Southern Pacific Railroad (3272 m.). Stock holdings also give the S. P. R. control of the Texas and New Orleans Railroad (4316 m.). The whole forms a transcontinental system radiating from New Orleans. The total investment is \$151,494,570.

Southern Railway, former Eng. railway company. Under the provisions of the Railways Act of 1921 the London and S.W. Railway, the London Brighton and S. Coast Railway and the S.E. Railway were amalgamated into a single company. Subsequently the Brighton and Dyke, the Freshwater, Yarmouth and Newport, the Fec on Solent and the Lynton and Barnstaple Railways were acquired. The company covered the whole S. coast from London to Margate. Dover, Brighton, Bournemouth and Plymouth and extended into Cornwall and Devon as far as Wadebridge and Ilfracombe. Its total mileage was 2138. It had an extensive seaborne trade and carried a large part of the Anglo Continental traffic to which it owned (1939) 46 steamers of 21,500 aggregate tonnage. The company owned several important docks including the great wharves for liners at Southampton and also possessed a number of important hotels. Its more recent developments were the extension of facilities for road transport, the electrification of many of its lines, especially the Brighton line and active participation in the enlargement of the docks at Southampton. The company was absorbed into the Southern Region of Brit. Railways in 1948 this region operating 2250 m. of track.

Southern Rhodesia, see RHODESIA.

Southernwood, see under ARFEMIST.

Southey, Robert (1774-1843), Eng. poet and historian, b. at Bristol and educated

at Westminster and Balliol College, Oxford. He was in his early years an enthusiastic admirer of the Fr. Revolution, and began in 1793 an epic on Joan of Arc which was pub. three years later. Cole ridge with whom S. had become intimate contributed passages to the poem. A visit in 1796 to a relative at Lisbon resulted in S.'s *Letters written during a Short Residence in Spain and Portugal* (1797). Then followed much miscellaneous writing, but in 1801 *Ihalaha the Destroyer* appeared and four years later *Madoc: The Curse of Aehana* which owes something to Beckford's *Valhek*, was pub. in 1810. When in 1813 the laureateship fell vacant, it was on the refusal of Scott offered to and accepted by S. who was already in the enjoyment of a small gov. pension. A *Poison of Judgment* (1821), a laudatory estimate of the king provoked Byron to write the magnificent satire bearing the same title. Of S.'s prose works must be singled out his *Life of Nelson* (1813) and *Life of Wesley* (1820). S. declined offers of the editorship of *The Times* and in 1835 of a baronetcy. His correspondence was ed. by the Rev. C. C. Southey (1843-50) and a selection by M. H. Fitzgerald in 1912. An ed. of S.'s *Journal of a Tour in Scotland in 1819* was pub. in 1929. See lives by C. F. Browne 1851, F. Dowden, 1874, W. Haller 1917, and J. Simmons 1941.

South Foreland see IORF AND.

South Framingham (Massachusetts, U.S.A.) see FRAMINGHAM.

Southgate bor. in the N.E. of Middlesex, England, 4 m. from Barnet. Formerly spelt Suthgate. It derived its name from the fact that it was the S. gate or entrance to Lushfield Chase. It includes New and Old S. and, in the latter the dist. of Palmers Green. Immediately N. of the latter is Vinchmore Hill which is included in the par. bor. of S. Leigh Hunt, the essayist was b. in High Street S. S. returns one member to Parliament 1910-1900.

South Georgia, barren is. in the S. Atlantic, 800 m. E.S.E. of the Falkland Isles, of which it is a dependency. It was discovered by Laroche in 1675 and is a Brit. possession. Sir L. Shackleton was buried here in 1922. A whaling settlement has been established at Grytviken Harbour with a permanent pop. of about 800 engaged in the whaling industry, it is otherwise uninhabited. It is also a sealing station. Area about 1000 sq. m.

Southhill, Baron, see BINGHAM.

South Holland, prov. of the Netherlands on the N. sea coast with N. Holland to the N., Utrecht and Gelderland to the E. and N. Brabant to the S. It contains the towns of The Hague its cap., Rotterdam, Leyden, Dordrecht and Delft. The branches of the low R. Rhine and canals, form a network of waterways. Cultivation is intensive. Area (land) 1130 sq. m. Pop. 2308,400.

South Indian State Railway, system operated by the Gov. of India, the contract of the former company being terminated in 1944. It covers the S. and S.W. area of Madras. There are 559 m. of 5 ft. 6 in.

gauge, and 1508 m (including 18 m electrified) of 3 ft 3½ in

South Island, see NEW ZEALAND
South Kazakhstan, region of the Kazakh S S R, bordering on the Uzbek and Kirghiz republics. The Syr Darya R flows through the region. Tns include Furkentan and Chirchik, the cap.

South Lancashire Regiment, see PRINCE OF WALES'S VOLUNTEERS

South Milwaukee, tn, in Milwaukee co Wisconsin 10 m S of Milwaukee. Electrical goods are amongst the manufs. Pop 11 100

South Molton, municipal bor of Devon, England, 10 m E S F of Barnstaple. It has a fine church. St Mary Magdalene built mainly in the Perpendicular style. S M is the centre of an agrie dist and besides the market on ann sheep fair is held. There are shirt making and costume industries. Pop 2900

South Omaha, formerly a separate city of Douglas co Nebraska U S A, on the Missouri R was annexed to Omaha in 1915

South Orkneys, group of is in the S Atlantic a dependency of the Falkland Is. discovered in 1821 by George Powell whose name they originally bore. There is an Argentine Gov meteorological station on Laurie Is., in 1945 that gov put forward claims to the possession of the S O Area 800 sq m. The is are uninhabited

South Pole, see under ANTARCTIC OCEAN GEOGRAPHY

Southport, municipal and co bor and seaside resort of Lancashire, England 15 m S W of Preston on the Irish Sea. It is a popular residential place and its mild climate attracts many visitors in the winter. S being indeed the prin winter seaside resort in the S of England in the summer it is a favourite resort with the workers in the Lancashire industrial tns. The municipal buildings in Lord Street consist of the tn hall, Cambridge hall and Atkinson public library and art gallery. There are numerous parks. S is the finest golfing centre in Great Britain within the boundaries of the bor there are four first class eighteen hole courses and two nine hole courses besides other eighteen hole links in the neighbourhood of the tn. The S pier, one of the largest in the country was purchased by the corporation in 1936, and considerable improvements are in progress. The floral hall and its annex in the S Marine Park, adjoining the promenade are used for dancing entertainments, concerts and conferences. Among the theatres are the Garrick, and the 'Little Theatre' for repertory companies. Rufford Old Hall 13 m E of S, built between 1480 and 1523 by Thomas Hesketh lord of Rufford and Great Harwood with several of garden and adjoining land, was given by the late Lord Hesketh to the National Trust in 1936. Pop 85 000

Southport, seaside resort of Queensland Australia, 50 m S E of Brisbane at the S end of Worston Bay. It is the chief centre for the rich dairying areas along the Nerang R and its tribs. Pop 11 000

South Portland, tn in Cumberland co

Value U S A on Casco Bay. The chief manuf is ironware, there are also boat-building yards and flour mills. Pop 15 800

Southsea, seaside resort and yachting centre of Hampshire, England, on the S side of Portsmouth of which it forms a part. It is noted for its fine South Parade picture gardens and the many attractions held in the summer season.

South Sea Bubble, name popularly given to the financial scheme under which the directors of the South Sea Company (which had been incorporated in 1710 by an Act which gave to it the monopoly of trading in the Indian Ocean and along the L coast of S America from the Orinoco to Cape Horn) made an offer to the gov in 1720 to pay off the whole National Debt and to buy up the irredeemable annuities amounting to £500 000 a year which had been granted in the last two reigns provided the different public securities were consolidated into one fund in their hands and the gov gave the company certain exclusive commercial privileges. The Bank of England projected a rival scheme but Parliament accepted that of the South Sea Company seeing that that company had in spite of the limited privileges conceded to it in the *Assiento* by Spain been highly successful in the slave trade. The moot question was whether the fund holders would convert their stock for shares in the company for they could not be compelled to do so. The issue however was not long in doubt, as the public, inflamed by the brilliant prospects held out by the directors of the gold and silver eldorado awaiting exploitation in S America crowded into the rush for shares, 4110 shares rose in price to £1000 the public disregarding the high improbability of the company being able to make a profit of 10 per cent in order to pay interest at the rate of 5 per cent. The fever of speculation did not end with the South Sea Company, numerous other concerns for the most part of a bogus nature and even patented so (as one was for carrying on an undertaking of great advantage but nobody to know what it is!), competing for public favour. The South Sea Company's presentation of some of these concerns merely served to open the eyes of the public to the recklessness of its own scheme and its shares dropped to £130, with the result that though the few who had sold out reaped enormous profits, the majority of those who had 'held on' were ruined and the failure assumed the proportions of the greatest financial disaster in the hist of this country. Sir Robert Walpole did much to restore national credit by arranging to assign 49 000 000 of South Sea stock to the Bank of England like amount to the East India Company, and to repay the bonus of £7 500 000 which the gov had received, by the combined operation of which arrangement the proprietors and subscribers got back about one third of their money. See L Melville *The South Sea Bubble* 1921

South Shetlands, or New South Shetlands, archipelago of twelve is in the Antarctic Ocean, 600 m S E. of Cape Horn, a

dependency of the Falkland Is. The chief are Livingstone, Smith, Clarence, George, and Deception. Deception Is. has a harbour, Port Foster which is ice free for five months in the year with a land station which arrives and departs with the whaling fleet. The group is also a centre for sealing. In 1918 area about 880 sq m.

South Shields, see **SOUTH LONDON**.

South Staffordshire Regiment, see under **STAFFORDSHIRE REGIMENTS NORTH AND SOUTH**.

South Stockton, see **THORNABY ON TEES**.

South Victoria Land, part of the Antarctic continent stretching S from Cape Adare in about long 160° E, W of the Ross Sea.

South Wales Borderers, Brit. regiment the old 21st Foot raised 1689 and fought under William III in Ireland and Flanders. It distinguished itself in Marlborough's campaigns and also in the Peninsular under Wellington. Further honours were gained during the Sikh war (1848-49) in India. Two outstanding events in the regiment's history are connected with the Zulu war of 1877-79 where, at Isandlwana, the regiment was badly cut up, the colour being saved by Lt. Melville and Coghill but at a loss of their lives while crossing the Buffalo River and the heroic defence of Rorke's Drift where one company withstood an overwhelming odds of Zulus. During the First World War the regiment raised eighteen battalions which served in France, Flanders, Macedonia, Gallipoli, Egypt, Mesopotamia and Islingtan. In the Second World War the 2nd S.W.B. were part of the 56th Brigade of the 19th (Armoured) Div. and in the battle of Normandy 1944 were in the front fighting from the Falaise pocket to the Seine and in the advance to the Belgian Dutch border. In Jan 1945 they were in hand to hand fighting in Zetten near Nimwegen, and Zetten Castle fell to the S.W.B. Battalions also served in Norway, Iraq, N. Africa, India and Burma. The Monmouthshire Regiment supplies territorial battalions.

Southwark, the Borough, metropolitan and par. bor. to the S.E. of London in Surrey on the S. side of the Thames with Bermondsey on the E. and Camberwell and Lambeth on the S. and W. respectively. It was annexed to the city of London in 1227. The cathedral of St. Saviour, formerly the priory of St. Mary Overy is in the early Eng. style and contains the tombs of Gower, Chaucer, Massinger, and other poets. Other interesting buildings are the Rom. Catholic cathedral and Guy's Hospital (severe war damage). S. with its many historic associations connected with the Tabard Inn, the George Inn, the old Globe Theatre and the Bear and Garden is now a crowded industrial dist. It suffered heavy air-raid damage in the Second World War. It returns three members to Parliament. Pop. 99,800.

Southwell, city of Nottinghamshire, England 15 m. N.E. of Nottingham. The oldminster of St. Mary was made a cathedral in 1884, the diocese being the cos. of

Nottingham and Derby, but in 1927 it was divided and Derby was made the centre of a new see. Bishop's Manor near the ruins of the palace of the archbishops of York is the episcopal residence. There is a sixteenth century grammar school. The chief manuf. is silk. Pop. 3800.

South-west Africa, see **AFRICA SOUTH-WEST**.

Southwold, mun. bor. and seaside resort of Suffolk, England 12 m. S.S.W. of Lowestoft. The par. church of St. Edmund is one of the finest in E. Anglia and was mostly rebuilt (1160-90) on the site of an earlier church destroyed by fire. The exterior is noteworthy for the magnificent clerestory and aisle windows. A splendid rood screen with panels depicting the twelve apostles extends across the nave and chancel. During the last fifty years the Corporation has done much to improve the town and protect the town from inroads by the sea. Pop. (estimated) 3000.

Southwood, Julius Salter Elias, first Viscount of Fernhurst (1873-1946), Eng. newspaper proprietor born at Birmingham. He spent his boyhood in London leaving school at the age of thirteen to become an errand boy. He became junior clerk to Odhams Brothers a firm of jobbing printers rising to the position of managing director of the firm as Odhams Press Ltd. and chairman in 1934. He acquired control of the *People* in 1925 and of the *Daily Herald* in 1929 and directed news papers and periodicals selling over 20,000,000 copies weekly. He was prominent in philanthropic work being chairman of the Great Ormond Street Hospital for Sick Children and numerous other benevolent bodies.

Souigny, Charles Soiel, Seigneur de, see **SOUTH CHANTS**.

Sovereign, gold coin current in England up to 1917 having then the value of one pound sterling or twenty shillings. A S. weighs 7.98805 grammes (123.2744 grains) it is 0.67 in in thickness and 36.8 mm in diameter. The proportion of pure gold is 91.6666 or 22 carats (24 carats being pure gold). The value of the gold content, at the present price of gold of £4 12s 3d an ounce is £2 0s 6d. By law the weight of each coin must be within a margin (or 'tolerance') of 0.1296 grammes (2 grains) either way from the standard weight. Up to 1917 gold was coined for general circulation and S. and half S. were interchangeable with the note issue. In that year gold coinage was suspended and has not since been resumed except for coinage of about 3,000,000 S. in 1925 to replace light weight coins in the stock of the Bank of England and the striking in 1937 of a small number of unmilld S. two pound pieces and five pound pieces as specimen pieces commemorative of the accession of King George VI.

A coinage of not more than 100,000 S. was undertaken in 1949 by the Royal Mint in order that it may preserve the inherited knowledge and craftsmanship of gold coinage which requires a different technique from coining in other metals, and greater precision in workmanship.

Sovereignty denotes the *de facto* relationship subsisting between the supreme power and the subjects of a state (*q.v.*). The S. of the state and the *poteslas* of the patriarch alike owe their efficacy to habitual obedience, yet it may be assumed that a community acquires political significance only when it has developed the art of warfare, and so estab. a place side by side with the largest contemporaneous communities. Therefore S. is a wide abstract term connoting the sum total of the powers vested in the cuning or king, or in his various anct. and modern substitutes. In this context there is a diametrical opposition between the analytical school (comprising Bodin, Hobbes, Bentham, Austin, etc.) and the historical or Hegelian school of thought. The tenets of the analytical school, after the manner of the formulation of medieval scholasticism in Aristotelian terms by St. Thomas Aquinas, are essentially dogmatic, and partake, especially with Austin, of the nature of self-evident propositions. But their cardinal fault is that they fail to appreciate the difference between *legal* and *political* S., and to recognise that the latter is inherent only in the people itself, whatever form of government (*q.v.*) may have developed within the community. Austin insists that the power of a monarch or 'sovereign member' is incapable of legal limitation, but Salmond suggests that though it is contradictory to say that sovereign power can be legally controlled within its own sphere, 'it is a distinct and valid principle to say that that sphere has legally appointed limits,' and adduces in support the fact that the courts accept and act upon the known and estab. limits of the powers of the Crown. With the Hegelians S. is a term descriptive of the real will of the community, which is not necessarily that of the majority. For an acute analysis of the S. of the King, Parliament see A. V. Dicey, *Law of the Constitution*, 1885.

S. is also the attribute of an independent state in international law and full S. is independence as recognised, in the comity of nations, in the description 'Sovereign independent state'; for the general rules of international law apply in their fullness only to sovereign states. The independence and the full S. of a state are, in fact, identical concepts; for the S. of a state extends over its subjects, over its ter., and over the ships which carry its flag on the high seas; and one dominant attribute of S. is the power of making war and peace, so that when a state employs force in another state, or on the high seas on board a ship which carries the flag of another state, the state so acting must find its justification in some principle other than S., as, for example, self-preservation.

Since the First World War it has, however, become increasingly recognised that though S. presupposes independence, it is not necessary for S. that there should be complete independence. It is regarded as compatible with S. that the sovereign may in certain respects be dependent on another power; the control, for instance,

of foreign affairs may be completely in the hands of a protecting power (see *further* under INDIRECT RULE; MANDATE SYSTEM; PROTECTORATE; SUZGERAINTY; UNITED NATIONS, CHARTER OF).

It may be said that consequent on the enormous development of air power sovereign independence has lost its more classic attributes. The principles implicit in the old Covenant of the League of Nations to some extent derogated from complete S., and it would seem that if the Security Council of the United Nations (U.N.O.) should have at its disposal an international 'police' force that of itself would detract from the *de facto* S. of all member states making contributions of men and equipment to such force and acknowledging its constitutional validity.

See B. Bosanquet, *The Philosophical Theory of the State*, 1890; W. W. Willoughby, *The Nature of the State*, 1896; E. Jenks *Law and Politics in the Middle Ages*, 1898; and H. J. Laski, *Problem of Sovereignty*, 1917.

Sovereignty of the Sea. 'It has become,' says Hall (*International Law*) 'an uncontested principle of modern international law that the sea, as a general rule, cannot be subjected to appropriation.' This principle has for the most part been adhered to in its integrity. Perhaps the only exception to it is the general recognition of a state's sovereignty over the waters adjacent to its own coast line at a distance of one marine league from the shore (see TERRITORIAL WATERS). At the beginning of the seventeenth century a vague right over all the seas surrounding Europe was set up by the various European nations, and these rights appear to have been theoretically based upon services rendered to commerce, though it is significant that such pseudo-rights were exercised only by such states as were possessed of strong fleets and were notable for the maritime prowess of their people.

The present state of international law concerning the S. of the S. is as follows: (1) Marginal waters belong to the states bordered by them to the extent of one marine league from the shore. (2) Basins of any area if approached by narrow entrances, large gulfs, which run deeply into the land, and small bays belong to the nations washed by them; though apparently no state asserts a right of property over broad straits of any great size and width of access (Hall). (3) All foreign nations are entitled to an innocent use of most territorial waters for the purposes of commercial navigation, though that right is regarded as limited to those waters the passage of which is either necessary or convenient for the navigation of open seas. See also WORLD WAR, FIRST, *Sovereignty of the Seas*. See W. E. Hall, *International Law*, 1880 (8th ed. by A. P. Higgins, 1924); L. Oppenheim, *International Law*, 1905-6 (3rd ed. by R. F. Roxburgh, 1920; 7th ed., 1948); and F. K. Smith (Lord Birkenhead), *International Law*, 1911 (6th ed. by R. McIlwain-Hughes, 1927).

Soviet (Russian, *sovet*, council), term particularly applied to the elected councils

upon which the political administrative system of Russia was based after the revolution of 1917. Workers' S. were elected in Moscow and St. Petersburg in 1905. In 1917 they again appeared and soon passed into the control of the Bolshevik party. *See further under RUSSIA.*

Soviet Central Asia, *see* CENTRAL ASIA (RUSSIAN).

Soviet System, system of gov. by elected councils, the theoretical basis of the gov. of Russia. At the base of the system, according to the Russian constitution, are the 'soviets of working peoples' deputies' in cities, and rural localities, which direct the work of subordinate administrative organs, and look after local affairs, justice, and the maintenance of order. Larger areas such as regions, dists., etc., also have soviets. All soviets, from the rural to the Supreme Soviet of the U.S.S.R., are elected by the citizens by direct vote.

Sovietsky, *see* TILSIT.

Sowerby Bridge, urb. dist. in the W. Riding of Yorkshire, England, 34 m. S.W. of Halifax, on the R. Calder and the Rochdale Canal. There are engineering works, and bedsteads are manufactured, chemicals, and woollen, worsted, and cotton goods, and carpets are produced. The adjoining tns. of Sowerby and S. B. were joined to form one par. and urb. dist. in 1926. The dist. was enlarged by the inclusion of Luddenden foot and Norland in 1937, and in 1939 by the inclusion of the former urb. dist. of Midgley. Pop. 19,800.

Sowing, of seed, both of garden and of field plants, is an operation on which the success of the future plant greatly depends. The smaller the seed the shallower should be the covering, and the larger the seed the greater the amount of soil that should cover it. The preparation of the seed-bed should depend largely on the habits of the plant, but while in general the soil should never be dust dry, it must not be so wet as to be sticky. Thin S. is to be recommended in almost every case. S. in drills has numerous advantages, the chief of which are that the plants can be hoed with ease, and also that the seed can be evenly covered. In agric. work seed S. was formerly done by hand. The machines in general use are the internal force feed drill, the external force feed drill, and the cup drill. Others with more limited use are tooth and brush pinion drills. Broadcasting seed barrows are often used for S. grass seeds, though the increasing modern tendency is to drill these seeds with force feed or cup drills. Combined drills, with separate hoppers from which fertiliser and seeds are sown at the same time, are now fairly widely used. Research on the placement of fertiliser in relation to the seed may well lead to adaptations of design which will expedite ideal relative placement of seed and fertiliser for the various crops.

Sow-thistle, name given to species of the composite genus *Sonchus* (q.v.).

Soya Bean, or **Soy** (*Glycine soja*), species of Leguminosae found in Asia, and especially in China and Japan, where it is cultivated for its fruits, known as soy,

soja, or sahuca beans. It is an ann. plant with stout, almost erect, or somewhat climbing stems, covered with rusty hairs, bearing trifoliate leaves, and from their axils two or three pods 1½ to 2 in. long. The seeds are used for soy sauce in the E., and for other dishes. Also an oil is made from them, while the residue is widely used for cattle food and as a fertiliser. The cultivated variety differs somewhat from the wild and is sometimes contradistinguished as *G. hispida*. A flour is also made from the S. B., and, being extremely nourishing, may be used for the same purposes as cornflour; it is a useful source of protein. The S. B. is also used in the manuf. of plastics, paints and varnishes, and glues.

Soymanof, Anne Sophie, *see* SWETCHINE, MADAME.

Spa, tn. in Belgium, 17 m. S.E. of Liège in the Ardennes, with mineral springs. It is the most important watering-place of the country, and was in the eighteenth century the most fashionable resort of this kind in Europe. It has a famous casino. In 1918 S. was the headquarters of the Ger. high command. William II. abdicated here on Nov. 10, and fled to Holland. In 1918-19 it was the seat of the armistice commission, and in 1920 a European conference was held here. A large factory produces every year about 50,000,000 bottles of S.-water. Pop. 9000.

Spaak, Paul-Henri (b. 1899), Belgian statesman and lawyer, b. at Scharbek. His grandfather, Paul Janson, and his uncle Paul-Émile Janson, both lawyers, were famous leaders of the Liberal party. His father, also a lawyer, is a well-known author, and his mother, Marie Spaak-Janson, was the first woman to enter the Belgian Parliament as a Socialist deputy. In 1916 S. tried to join the Belgian Army, but was caught and interned in Germany until the end of the war. After his liberation in 1919 he studied at the Free Univ. of Brussels, and then practised at the Bar. In Sept. 1930 he defended Fernando de Rosa, who on Oct. 24, 1929, made an attempt on the life of Prince Umberto in Brussels. From 1925 to 1936 he was tn. councillor of Forest. In 1932 he entered Parliament as a Socialist deputy for Brussels, and thus began his meteoric and brilliant career. From 1935 to 1949 he was a member of nearly every gov. in that period, and was three times Prime Minister, being the first Socialist Premier of Belgium. From Sept. 1939 to 1945 he was minister of foreign affairs in Pierlot's gov., which he accompanied in 1940 to London. After the general elections of June 1949, when the Socialist party became the opposition, S. was succeeded as Prime Minister by G. Eyskens, and the dept. of foreign affairs, of which he had been the dynamic head, almost without interruption for about thirteen years, was taken over by Van Zeeland. During his terms of office he played a prominent part in the promotion of the 'Benelux' (q.v.) customs agreement (1944); the Brussels Treaty (q.v.), presiding over the treaty meeting in March 1947;

the O.E.C.C. or Organisation for European Economic Co-operation (q.v.), presiding over the meeting of the sixteen Marshall Aid countries in Paris in April 1948 and over the meeting of the O.E.C.C. in March 1949 (see *EUROPE, European Recovery Programme*) and the negotiations for the N. Atlantic Pact (q.v.). He was an equally conspicuous figure in the activities of the United Nations organisation, and was elected in Jan. 1946, as first president of the United Nations Assembly. In Aug. 1949 the European Consultative Assembly at Strasburg (q.v.) unanimously elected him to preside over their first meeting. On the return of King Leopold to his throne on July 23, 1950 he maintained his



A.ystone

PAUL HENRI SPAATZ

party's opposition to the restoration, which had been effected by the majority vote of the Christian Social party on a Bill, submitted on July 20 to a joint session of both Houses of Parliament, to enable the king to resume the exercise of his prerogatives.

Spaatz, Carl Andrew (b. 1891) American. In 1914 he graduated from W. Point and served in the air arm in France. In 1941 he became chief of staff to Gen. Arnold, head of the army air forces, and in 1942 became Amer. air commander in Europe. He was later allied air commander in the Mediterranean (1943), and head of the Amer. strategic air force in N.W. Europe (1944), and later in the Pacific, and chief of all Amer. air forces from 1946 until his retirement in 1948.

Space and Time. The present century has seen remarkable developments in the theory of relativity which have been responsible for profound modifications in the views of physicists, astronomers, mathematicians, and also to a large extent of philosophers. Not the least amongst these modifications is the new conception

of S and T, though the problem of S. and T. is not a new one. Nicholas of Cusa (1401-64) held that S. and T., being merely products of the mind, are inferior to the mind that created them. Giordano Bruno (1548-1600) pointed out, what every amateur astronomer now knows, that such words as 'above,' 'below,' 'at rest,' and 'in motion' are meaningless in the universe of revolving suns and planets, for which there is no fixed centre. There is a remarkable contrast between these views and those of Newton, who regarded the material world as a collection of particles, each one of which could be at rest, not merely with reference to others, but at rest in *space* or could move through *space*. In more recent times, before Einstein advanced his views, Poincaré, the great French scientist, pointed out that we cannot form any conception of empty space. He reminded us that if the dimensions of the universe increased a thousandfold, it would remain the same, giving 'same' the meaning that it has in Euclid's *Elements of Geometry*. While an object that previously measured a metre would now measure a kilometre, no one would know anything about it because measuring rods would have changed in the same ratio. The same applies to time, and if some supreme power made all the phenomena of the universe a thousand times slower, so that every minute recorded by our clocks would be more than 16 hrs., no one would be aware of the change.

From these two illustrations it is not difficult to see the point of view of the relativist who asserts that our measuring rods make space and our clocks make time. To the layman this may seem revolutionary; he has been accustomed to regard S. and T. as absolute and each independent of the other, but as will be seen, Einstein's special theory of relativity disposes of this fallacy and shows that S. and T. has no meaning for the relativist, the correct designation being 'space time'. The popular conception of S. and T. has been compared to the banks of a riv. which flows on to the ocean carrying the debris down with it, the banks are like space and the stream like time, each independent of the other, the banks being merely disinterested spectators.

In Einstein's *Relativity* the *Special and the General Theory* an illustration which is easily understood is given of the impossibility of separating space from time, if accuracy of definition and description is required. A man stands at the window of a railway carriage travelling with uniform velocity, and drops a stone on the embankment. He sees the stone descending in a straight line. Someone standing at the side of the track also sees the stone falling, but not vertically as the one who dropped it saw it, he sees it describing a parabola, the well known curve in which projectiles move (atmospheric friction is ignored in all cases). Who is correct in his description of how the stone travels? The man who dropped it is correct in saying that its motion was vertical referred to the railway carriage; the man

on the side of the track is also correct in saying that its path was a parabola with reference to himself. Expressed in mathematical language, the body described a vertical path with reference to a certain system of co-ordinates and a parabola with reference to another system of co-ordinates, the first system being rigidly attached to the carriage and the second to the ground. This simple example shows quite clearly that there is no such thing as an independently existing trajectory; the trajectory is dependent on the body of reference. In addition, for a complete description of its motion we must specify how the body alters its position with time. If we want to deal with every point on each curve it is necessary to specify the time at which the body was there. This does not seem a very difficult matter provided each observer possesses a clock of identical construction, so that both can determine positions occupied by the stone at each tick of the clock. It is unnecessary to deal with practical obstacles to extreme accuracy owing to inadequate observations etc. We may assume that those are perfectly carried out by perfect instruments, but even then a serious difficulty arises in connection with another matter to which we must now turn our attention, the question of simultaneity. Suppose a train is travelling along an embankment with a number of passengers, and two flashes of light which are simultaneous with regard to a point on the embankment occur at points *A* and *B*, would they also be simultaneous with reference to passengers in the train? To answer this question draw a straight line *AB* and take *M* as its centre. The light from *A* and *B* will reach *M* on the embankment at the same instant, but now suppose *M* is a passenger midway between *A* and *B* but on the train which is moving towards *B*. Remembering that the velocity of light is finite and that in the time required by the light to reach *M* the passenger in the train has moved (very little, it is true) towards *B*, he will see the light from *B* before he sees that from *A*. Hence observers who take the railway carriage as their reference body must conclude that the flash from *B* occurred earlier than that from *A*. An observer on the embankment at *M* will not agree with this verdict. Hence we reach the following important conclusion: events which are simultaneous with reference to the embankment are not simultaneous with reference to the train, and vice versa. Every reference body has its own particular time, and unless we are told what is the reference body to which the 'time' refers the statement about the time of an event is meaningless. This shows that in the case of the falling stone there is no such thing as simultaneity regarding the man in the moving train and the man on the ground, and raises a difficulty about describing the motion of the stone. Time has no absolute significance, and is not independent of the motion of the body of reference, and so simultaneity must be regarded as merely relative. The same applies to distance: the length of the train

as measured from the ground is not the same as that which is determined by measuring in the train in motion. An explanation of this requires a number of mathematical formulae to which readers can refer in some of the works quoted at the end of the article on relativity. It will be sufficient to give a summary of the results which have been attained in consequence of the Michelson-Morley experiment, and to simplify the matter the velocity of light per second *in vacuo* will be taken as the unit in all cases, this implies that the orbital velocity of the earth, for instance is 0.0001, as this multiplied by 186,000 gives about $1\frac{1}{2}$ m. per sec which is the mean speed of the earth in its revolution. The symbol *u* will be used to denote the velocity of one body with reference to another, and we shall suppose that *B* is an observer with reference to whom *A* is moving with a velocity *u*. The following are *B*'s estimates of the state of affairs in *A*'s world. *B* says that a clock in *A*'s world registers an interval which is only $\sqrt{1-u^2}$ that of the true interval. He also says that a measure placed parallel to the direction of *A*'s motion registers only $\sqrt{1-u^2}$ of the true length, though if placed at right angles in this direction of motion it registers the true length. *A* holds precisely similar views with regard to *B*'s world, and each is correct from his own point of view.

Now apply these results to the case of a body possessing very high speed say about half that of light (this is not a mere supposition as some of the very far-off spiral nebulae are receding from us with speeds approaching this). Suppose that the earth had this orbital speed, and someone who was stationary with reference to the sun observed it, what would he say it looked like? Substituting $\frac{1}{2}$ for *u* in the above expression it is seen that the diameter of the earth in this case would seem to be 0.866 of its diameter as judged by someone who shared in its motion, that is, its diameter in the plane of its motion would appear to the observer to be about 7000 m. instead of 8000 m., and it would appear like a flattened ellipsoid. Observers on the earth who shared its motion could not detect this flattening because their measuring rods would share in the contraction. In the same way clocks on the earth would register intervals which are only 0.866 of the true interval, if the word 'true' is applied to the judgment of the observer *B*. Earth dwellers would say that clocks on *B*'s world registered intervals in precisely the same way, that is, 0.866 of the true interval, using 'true' as applying to their judgment. It may be added that the mass of a body increases with its velocity, but as this is explained in the article on relativity it is unnecessary to deal further with this matter. In some of the explanations that follow time intervals will be measured in seconds and space intervals in the number of seconds that light requires to travel over the distance under consideration. Thus, light requires 500 sec. to travel from the sun to the earth when the sun is at its mean distance from the earth, and hence the space

distance of the sun is 500 sec. Similarly the space distance of a body twice the sun's distance would be 1000 sec., and so on.

We shall now consider an observer O who judges that the world of A is moving away from him, say due E. for convenience, with a velocity 0.8. In A 's world another observer there says that there are two special events, the second occurring 6 units due E. of the first and 10 sec. later. How does O record these time and space intervals? Without showing how the results are attained it may be stated that O says the time interval is 21.67 and the space interval 23.33. Another observer O' says that A 's world is moving from him due E. with a velocity 0.3 units, which is quite consistent with O 's opinion, because both O and O' may have their own velocities independent of that of A 's world. The opinion of O is that the time interval is 12.37 and the space interval 9.43. Now suppose we find the value of $t^2 - s^2$ in each case we have the following results: $24.67^2 - 23.33^2 = 64$; $12.37^2 - 9.43^2 = 64$, and if we took any number of cases, varying as we please the velocity of A 's world, but retaining the second special event 6 units from the first and 10 sec. later, the number 64 will always be obtained. The expression $\sqrt{(t^2 - s^2)}$, which is 8 in the present circumstances, that is $\sqrt{(10^2 - 6^2)}$, is called the *separation* of the two events (a name which is due to Prof. A. N. Whitehead, but *interval* is also used), and is a fusion of S and T . It is independent of the world in which the records are made, and represents an intrinsic property connecting the two events, irrespective of the conditions under which they were observed. If we take A 's world to be the earth, and O to represent any of the solar planets or planets of stars in some distant nebulae, then as all these planets have different velocities with reference to the earth, an observer on each one would make different records of t and s , and each one is entitled to his own view. If, however, an observer on the earth says that there are two special events, the second occurring 6 units from the first and 10 sec. later, although the different observers will not agree with these figures, they will all agree that the separation is 8. If A 's time and space intervals between the events were 40 and 24 respectively, the separation for every one would be $\sqrt{(40^2 - 24^2)} = 32$, however much we altered the velocity of A 's world relative to the observers, or, what is the same, the velocities of the observers relative to A 's world. It will be seen from all this that if a number of objects are at rest with respect to one another a three dimensional continuum can represent their spatial relations, but it cannot do this if the objects are in motion with reference to one another. A fourth dimension of the nature of time must be added, thus forming the space-time unity. Moreover, the separation in this case between two events, which is equal to the proper time for that body, that is, the time interval measured by a clock in the body's universe, is a maximum. While an infinite number of paths can be drawn

joining two points in space-time, one stands out unique and all observers agree that it provides a separation greater than any other. This world line is called a *geodesic*, and is the path followed by bodies which are left to themselves. Bertrand Russell in *The ABC of Relativity* calls this tendency to follow a geodesic the law of cosmic laziness. As the earth moves round the sun it chooses such a route that the time of any portion of its course, judged by its own clocks, is longer than the time judged by clocks which move in any other route. The well-known law that a body follows the line of least resistance can still be regarded as true, but as Einstein's geometry has superseded Newtonian mechanics it is now more correct to say that a body follows a geodesic.

Up to the present the principle of restricted relativity only has been dealt with; this principle was enunciated by Einstein in 1905, and in simple language it implies that no experiment can detect uniform motion through the ether (assuming that the ether of space exists). In 1915 Einstein's general theory of relativity was pub., and this deals with events moving relatively to one another with *variable* velocity. Far-reaching problems are opened up by the general theory which is more difficult to explain than the restricted theory. Readers are recommended to study some of the more elementary books in the list at the end of the article on relativity, with particular attention to (Durell) the description of the observer in a lift with a transparent bottom through which he can view the earth as he drops towards it after release from an aeroplane. This explains the principle of equivalence (of fundamental importance in the general theory of relativity) which may be stated as follows: A gravitational field of force is equivalent to an artificial field of force, or to a frame of reference moving with uniform acceleration in a field where there is no gravitation, so that in any small region it is impossible by any experimental means to distinguish between them. The presence of matter, while responsible for creating a gravitational field, can nevertheless be neutralised by an observer in his immediate neighbourhood, and within this small neighbourhood the principles of the restricted relativity are applicable. If, however, an observer is moving through a space-time domain in which there is matter, although he can neutralise the gravitational field in his immediate vicinity and measure the separation of events by his own clock, other observers in different worlds will not agree with him. They will say that the presence of matter has distorted the space-time in its neighbourhood (and the more matter there is the greater is the distortion), and the geodesic, which is straight in the restricted theory to all observers, is no longer straight. To them the path for maximum separation is now curved owing to the distortion of space-time. All this eliminates the necessity for an 'attractive force' exercised by the sun on the planets

which causes them to describe ellipses with the sun in one focus. Each planet simply selects such a path that when the crumpling up of space time owing to the presence of a massive body the sun is allowed for the separation measured along the path between any two events is a maximum. As an illustration we may take the case of a steep hill on which large boulders or other obstructions such as trees etc. prevent us from walking in a straight line to the top. Instead of attempting to walk in a straight line it will often be much easier to take circuitous routes thus avoiding the obstructions. Newton's law of gravitation has now become a geometrical law that everybody pursues the easiest course from one place to another a course which is beset with obstacles in the tangled domain caused by the presence of a great mass like the sun or any other body. The paths of the planets or other heavenly bodies computed on the basis of the Newtonian law of gravitation fit in so closely with the actual paths as observed that Newton's law was generally accepted until recent times. The movement of the perihelion of the orbit of Mercury, which puzzled astronomers for many years is inexplicable on Newton's law but is explained with only a very small discrepancy on Einstein's geometrical law which may be regarded as permanently established. See Sir A. Eddington *Space Time and Gravitation* 1920. S. Alexander *Space Time and Duty* 1920. I. Borel, *Space and Time* 1926. H. H. Sheldon *Space Time and Relativity the Einstein Universe* 1932. R. S. Lyddard *Time Number and the Atom* 1945. W. W. Himmelschmidt, *Whitehead's Philosophy of Time* 1947 and S. Hoyle, *The Nature of the Universe* 1950. See also bibliography to RELATIVITY.

Space Heating, see GAS SPACE HEATING HEATING and VENTILATION.

Spaceships and Space-travel, see under INTERNATIONAL SOCIETY BRITISH and ROCKETS.

Spa Conference, held in 1920 between representatives of Germany and the Allies to give practical effect to the provisions of the Versailles peace treaty. A scheme for reparation payment was proposed by Germany but the Allies were not at that date prepared to discuss it from a united standpoint. The conference however decided the proportion in which any sums received in reparations should be divided amongst the allied nations and also the priority of claims as against each other. In the main these agreed proportions remained valid although some modifications were subsequently made (see DAWES PLAN, YOUNG PLAN REPARATIONS).

Spaghetti, see under MACARONI.

Spahi, name derived from the Persian word 'Sipari' whence the Ing 'Sepoy' formerly applied to part of the Turkish cavalry before the reorganisation of 1836. From 1326 to that time they formed a formidable part of the sultan's army. The Fr give the same name to a body of light cavalry organised in Algeria and Tunisia.

Spahlinger, Henry (b. 1882) Swiss bacteriologist b. at Geneva educated at

Geneva Univ. in science medicine, and law. In 1912 he began to treat tuberculosis patients his chief process being injection of antigens i.e. scrums obtained by passing toxins artificially obtained from bacilli through the blood of horses. S. is also an authority on tetanus.

Spain, state of S.W. Europe between 36° and 43° 45' N lat. and 1° 25' E and 9° 20' W long., occupying almost the entire Iberian peninsula. It is separated from France on the N. by the Pyrenees, and on the E. and S. is bounded by the Mediterranean the N.W. corner fronts the bay of Biscay (N.) and the Atlantic (W.) while Portugal and the Atlantic Ocean completes the W. boundary. Continental Spain occupies about eleven thirteenths of the Iberian peninsula Portugal occupying the remaining portion. Geologically the peninsula is composed of a huge mass of ancient rock lying between lofty and much lower mountain ranges. The Meseta which is the name given to the huge block of rock, lies between the lofty mountain ranges of the Pyrenees which are continued in the Cantabrian Mts. and the mt. range of Andalusia. The Meseta is particularly well drained by a series of parallel rivers which flow from the E. to the W. The most important of the rivers is the Guadalquivir which flows through Andalusia from the mts. in the N.E. to the Atlantic and is navigable as far as the town of Seville. The other rivers, chief among which are the Minho the Douro, the Tago and the Guadiana are too deeply sunk in their rocky valleys to be of use for the purposes of irrigation and too small in volume to be of importance as navigable rivers. The Ebro is the greatest river and is of great use in irrigating the fertile plains of Aragón and Catalonia. The Imperial Canal which flows parallel to it, forms also a fairly important waterway.

MOUNTAIN SYSTEM—The Pyrenees form the boundary between France and Spain and continue to the Atlantic under the name of the Cantabrian Mts. to the N.E. and running in a S.E. direction is the range of hills which forms the watershed between the Douro and Tago on the one side and the Ebro on the other. These mts., following roughly the coast of E. Spain finally merge into the Sierra Nevada which find an end in the rocky promontory, Gibraltar. Dividing the country up by three long parallel ranges are the Sierra Morcua which divides the valleys of the Guadalquivir and the Guadiana the mts. of Toledo which divide the Guadiana and the Tago and the Sierra de Guadarrama which separates the Tago and the Douro.

CLIMATE AND VEGETATION—The hinterland of the bay of Biscay and Atlantic coast has an equable climate (mild in the N.W. of Spain has the greatest rainfall (Santiago de Compostela 86 in. per annum average). In the Meseta the winters are cold and raw, a short spring being followed by hot summers. Madrid has a temp. which reaches over 108° F. in the summer and is often below zero in winter. The lofty Guadarrama Mts., at

a short distance from the cap., are covered with snow during the greatest part of the year, and there winter sports can be enjoyed to a certain extent. The hinterland of the Mediterranean coast enjoys from the Fr. frontier to Valencia a delightful all-year-round climate, the differences of temp. during the day being gradual. From Valencia to Gibraltar the coastal ter. is of sub-tropical character, the Málaga region being well known for its mildness of temp. the whole year round. In general the rainfall is small, the rains being never persistent. The prov. of Almería, with 10 in. rainfall in the year, is the driest. The Mediterranean flora is found in a great many parts of the peninsula, but in the mountainous regions of Castile vegetation is scarce owing to the extreme cold of winter and extreme dryness of summer. The vegetation of the S.W. of the peninsula is extremely luxuriant.

AGRICULTURE.—Nearly two-thirds of the pop. of Spain is dependent upon the soil for an existence. The country is generally fertile and is well suited to agriculture, though in some parts it is conducted under difficulties since the soil has to be artificially produced from the solid rock of the mts. Every available piece of country has been converted by the use of manures into fertile ground. Irrigation works are a necessity. Fruit trees are cultivated in abundance, and in Murcia and Valencia are found the orange tree, the date palm, and the pomegranate, together with such tropical products as rice, cotton, sugarcane, and maize. Wheat can be produced one hundredfold, and the olive and the vine are also extensively cultivated and can be produced from land which does not need artificial irrigation. Wheat is produced in great quantities in Valladolid, and yet the supply is often insufficient for the home market. Other products are oats, rye, flax of the highest quality, and hemp, cane sugar, esparto, pulse, cochineal (Canary Isles), and silk. The vine flourishes in every prov.: in the S.W. Jerez, the well-known sherry, and tent wines are made; in the S.E., the Málaga and Alicante. The oak forests of Estremadura are also an important feature of Sp. agriculture, and make swine-keeping profitable. In Andalusia and Salamanca horses and cattle are reared; the bulls are used extensively in the Sp. national sport, the bull fight.

MINERAL WEALTH.—The peninsula is very rich in minerals, and mining is an important industry. In the prov. of Ciudad Real, on the N. slopes of Sierra Morena, are the well-known quicksilver mines of Almadén. In the prov. of Huelva, in the S., is to be found the Rio Tinto, one of the richest copper-mining regions in the world. Its mines were exploited by the Carthaginians and the Romans. An Eng. company works the prin. mines, and they are in full production. According to the *Anuario estadístico de España* (1947) the main mineral production is as follows: coal, including lignite and anthracite—Asturias, Pinar-

roya, and Bilbao; iron ore—Bilbao region, Asturias, Almería, Seville, Cartagena, and Sp. Morocco; copper—Huelva; potash—in the N.E. region; sulphur in the Mediterranean region; lead—Cartagena, Almería, Huelva. Other minerals are tin, silver, graphite, manganese, wolfram, mica, phosphorite, and zinc. The exploitation of this wealth is difficult owing to lack of transport, which is hindered by the mountainous structure of the land.

INDUSTRIES.—Catalonia and the Basque country in the N. lead in industry, with Catalonia well ahead in the production of textiles. The main industries after the above-mentioned are fishing, which is greatly on the increase; mining and metallurgy; chemicals, mainly alcohol; paper and cardboard, doubled from 1945 to 1950; leather goods; toys; printing, showing great progress; and a number of other industries. The number of mines that stood in 1940 at 672 had risen by 1950 to 1865, whilst the number of factories also greatly increased.

TRADE.—In order of importance Spain exports fruit (oranges, grapes, apricots, as well as sev. kinds of fruit pulp); wines, including sherry; iron ore, pig-iron, and sundry minerals, including mercury; textiles, cork in slabs and granulated, with a certain amount of manufactured bottle-corks, salt, and fish, such as sardines in tins. In smaller quantities Spain exports perfumes, essences, and leather goods. The main imports are petrol, coal, cotton, jute, cereals, coffee, sugar, tobacco (Sp. production of tobacco is on the increase), paper and wood pulp, cellulose, timber, and dyes.

The chief countries to which Spain exports, in order of importance of trade, are U.S.A., Great Britain, Switzerland, Sweden, Argentine, Brazil, Portugal, and Sp. Amer. countries in general. The trade with France had (1950) greatly diminished. Countries exporting to Spain, in order of importance of trade, are U.S.A., Argentina, Great Britain, Brazil, Switzerland, Portugal, and France.

COMMUNICATIONS.—Internal communication is difficult, owing to the physical features of the country. The railways are almost without exception wonders of engineering, and the roads have been with difficulty constructed through a rugged country. Main lines in Asturias, Catalonia, and the Basque provs. have been electrified. The first railway opened to public traffic was the Barcelona-Mataró line in 1848. The original capital for construction came largely from Fr. sources, and by 1900 two main companies operated the broad-gauge system. The damage caused by war was great, and in 1941 all the broad-gauge railways were taken over by the state. The narrow-gauge railways were not nationalised, but were grouped into regional 'federations.' A council is by law provided for, to co-ordinate rail and road transport. There are 7058 m. of 6 ft. 6 in., and 2838 m. of narrow-gauge, chiefly metre; 818 m. are electrified. The official gauge of the prin. railways has heretofore, for strategic reasons, been kept different from that of

France, and consequently passengers are obliged to change trains at the frontier stations. Regular services are maintained by Iberia, the principal airline with London, Switzerland, Buenos Aires, Lisbon, Tangier, Spain, Morocco and the Canary and Balearic Is.

AREA—The area of continental Spain is 189,800 sq. m., but the total area, including the Balearic Is., the Canary Is. and the Spanish possessions on the N. and W. coasts of Africa is 19,504 sq. m. The coastline extends 1317 m. of which 712 m. are formed by the Mediterranean and 605 by the Atlantic.

NATURAL DIVISIONS AND TOWNS—The density of pop. per square mile in Spain



Sp. 1. 1. Tourist Agency
THE SOUTH COAST MARIAGE

is less than 10. All the large towns (except Madrid) lie in the slits of the plateau. Two thirds of the whole pop. (some 27,000,000) including the Balearic and Canary Is. live in the towns or their immediate neighbourhood and occupy considerably less than half of all the available land. The country is divided into fifty provinces (including the Canaries and the Balearic Is.) which have been marked out with little consideration for geography or history. The larger divisions of the country which correspond more or less with the former great kingdoms are not altogether disregarded but play only a small part in the history of the country as compared with their former position. The historic divisions are Castile, Asturias, Extremadura, Leon, Galicia, Andalusia, Valencia, Murcia, Catalonia, Aragon, Navarra, and the Basque provinces. The towns as has already been noticed stand on the outskirts of the Meseta, and the most important are the seaports. In the N. are the naval port of Ferrol and the towns of Coruña (La Coruña) and Vigo. The ancient town of pilgrimage Santiago de Compostela, does not now rank as a town of

premier importance save in so far as it is historically famous. Gijón, Santander, Bilbao all owe their importance to their proximity to the mines and their export trade. The inland towns of Leon, Salamanca, Avila and Burgos retain their importance in the history of Spain and can be considered as museum cities with little industrial development although of some agricultural importance. Victoria and Pamplona both of which played an important part in the Peninsula war are fortresses guarding the passes of the Pyrenees. Valladolid is the centre of the basin of the Douro and owes its importance to this fact. Madrid practically in the centre of Spain is what may best be termed an artificial city. During the last ten years this city has made great progress and is developing into a magnificent capital. In the S. portions of Andalusia are three towns of considerable importance. Cordova (or Córdoba) noted for its magnificent mosque which is now a cathedral, Seville, a great centre of manufacture and trade possesses a beautiful cathedral and Cádiz, the guardian of the entrance to the Guadalquivir. In Upper Andalusia lies the famous town of Granada with its magnificent and historic Alhambra. Murcia lies here also famous as a great centre for the export of the products of Andalusia. Cartagena owes its importance to the fact that it has a magnificent harbour and has developed into a great naval port whilst the mining in its immediate neighbourhood has added greatly to its prosperity. Valencia lies to the N. and is the third greatest town of the whole of Spain. Catalonia is the centre of industry. Here lies Barcelona, the second of the Spanish towns. Living in the centre of Aragon is the ancient city of Saragossa (Zaragoza). Cities and towns with a pop. of 50,000 or over are: Madrid 1,200,000, Barcelona 1,350,000, Valencia 500,000, Seville 275,000, Saragossa 268,000, Malaga 209,000, Bilbao 185,000, Murcia 166,000, Granada 140,000, Cordova 118,000, Valladolid 111,000, Coruña 104,000, San Sebastián 104,000, Santander 102,000, Cádiz 100,000, Alicante 97,000, Cádiz 88,000, Oviedo 83,000, Gijón 80,000, Lugo 77,000, Ferrol 72,000, Almería 70,000, Vigo 66,000, Pamplona 62,000, Burgos 61,000, Huelva 56,000, Badajoz 50,000, Jaca 50,000, Victoria 50,000 and Castellón 50,000.

THE SPANISH ISLANDS AND POSSESSIONS—The Balearic Islands (pp. 4, 100) of the Mediterranean are reckoned as part of Spain. The chief town of the islands is Palma. Minorca is a strategic position of some importance. The Canaries lie off the N. coast of Africa (the chief of which is Ceuta) and the Canary Is. (pop. 325,000) off the W. African coast are also Spanish.

Spanish colonial possessions on the Atlantic coast of Africa are the Cape Verde and Rio de Oro. These together with those in the Gulf of Guinea cover an area of about 140,000 sq. m., with a pop. of 1,250,000. Spain also exercises a protectorate over part of N.W. Morocco.

With the exception of Portuguese-speaking Brazil and the Gulanas, Sp. is the language of all the countries of the New World from Antarctica to Mexico, and Spain maintains strong cultural and commercial ties with Sp. America.

Constitution.—Spain (excepting a republican interlude, 1873-75) was an hereditary monarchy until Alfonso XIII. left the country in April 1931 without formal abdication. After the civil war of 1936-39 the grand council of the Falange Española Tradicionalista y de las Juntas Ofensivas Nacional-Sindicalistas, replacing the Cortes, met at Burgos to legislate for the reorganisation of the state under

EDUCATION.—There are twelve univs. in Spain proper, at Barcelona, Burgos, Granada, Madrid, Murcia, Oviedo, Salamanca, Santiago, Seville, Valencia, Valladolid, and Saragossa. Primary education is compulsory and free, but in 1947 the census showed that 20 per cent of the total pop. was illiterate. There are secondary schools in each prov., but attendance is small. There are training colleges for teachers in elementary schools. In the Canary Is. there is a univ. at La Laguna.

DEFENCE.—Spain is divided into nine military regions, eight being the headquarters of an army corps and one of a



Spanish Tourist Agency

PEASANTS OF JEREZ DE LA FRONTERA

A WOMAN OF MAJORCA IN FIESTA DRESS

Gen. Franco, who had assumed the title of El Caudillo (Leader) of the Empire and Chief of the State. In 1942 the Cortes was restored, and comprises 438 *procuradores* (members). In 1947 Franco proclaimed Spain once more a monarchy but with a regency council under himself, and no king would be restored until Franco's death or disability. (The claimant to the Sp. throne in 1950 was Don Juan, son of Alfonso XIII.) The results of a popular referendum on this succession law, held in July 1947, were stated to show an overwhelming majority in its favour.

RELIGION.—Under the post-civil war regime Catholicism was restored as the religion of the state. Religious bodies recovered their legal status; confiscated property was restored; allowances to clergy were again paid by the state. There are nine metropolitan sees and sixty-one suffragan sees, the chief being Toledo, see of the primate.

div., and two independent commands, in the Canaries and the Balearics, as well as two corps in Morocco. The army corps comprise nineteen infantry divs. in all. There is also a cavalry div. The navy consists of six cruisers, nineteen destroyers, eight sloops, six minelayers, six submarines, seven minesweepers, and other smaller vessels. In 1949 eighteen destroyers, five sloops, nine submarines, and smaller craft were under construction. An independent air force was estab. in 1939, divided into a number of air regions and oversea commands. In 1946 defence expenditure comprised 34 per cent of the total ordinary budget.

HISTORY.—The pre-hist. of Spain has attracted a good deal of attention in recent years. The distribution and significance of megalithic culture have an important bearing on the Neolithic culture of W. Europe. The cave-art of Spain is known to all students of early art. Im-

pressive cave-paintings of great antiquity have been found in the prov. of Asturias (Cuevas de Altamira, Santander), and many others in different parts of the peninsula. In Spain there are also shelters with Neolithic drawings. Recent research into the obscure question of the earliest inhab. of Spain point to the Ligurians, of probable Indo-European origin, as having been the first settlers, followed by the Iberians who originated in Africa, and were related to the Libyans, and the Berberines. There is now no doubt that they reached Spain during the Neolithic era. Towards the end of the Bronze Age the Thartasians settled on the shores of the Guadalquivir R. They spread to the S.E. of Spain and drove the Iberians to the lands beyond, and to the N. of Alicante. About 600 B.C. Spain was invaded by the Celts who occupied the N. of the country, Portugal, and the Meseta. They entered Spain via the Pyrenees and arrived at the W. Atlantic coast. The Iberians forced their way into the Meseta and, after warring with the Celts, ended by forming a single people, the Celtiberians, about 350 B.C. At the beginning of the Iron Age the Phoenicians and Gks. estab. colonies in Spain. In 550 the Phoenicians summoned Carthaginian help against native attacks but in 501 were expelled from the peninsula by their allies, who dominated Spain until they were in turn subjugated by the Romans.

Rome divided Spain into two provs., 'Hither' Spain (the N.) and 'Farther' Spain (the S.). Each of these provs. was governed by a Rom. pro-consul, who was appointed annually. The Carthaginians had only conquered the coast, but the Romans undertook many campaigns for the subjugation of the interior and suffered many defeats. Numantia, which offered the strongest opposition, finally fell in 133 B.C. and after this even the fierce tribes of N. and Central Spain began to be romanised. S. Spain had long before this accepted the civilisation of Rome, and become completely a Rom. prov., supplying both men and wealth to the Rom. republic and being dotted here and there with Rom. settlements. Caesar, when governor, here encountered some opposition, and during the days of the early empire a large Rom. force was kept in the country. But all the while the process of Rom. civilisation had been going on, and before the beginning of the Christian era Spain may be regarded as a country which had become Rom. in language, customs, and religion. The literature of the first century of the Rom. Empire is largely Sp. in origin. Marcus Fabius Quintilian and Lucius Anneus Seneca being the most famous among the many rhetoricians, philosophers, and writers born in Spain.

With the decline of the Rom. empire, the 'barbarians of the N.' entered the peninsula (A.D. 409), and after many vicissitudes the Asian Visigoths under Euric (Evaric) estab. their supremacy and remained the rulers of Spain until the beginning of the eighth century.

It is necessary, however, to notice that in spite of the fact that the barbaric invasion had a tendency towards breaking up the civilisation of Rome, the Rom. law and Rom. system of administration were too firmly ingrained to be swept away even by the barbarian invaders. The administration was modelled directly on that of the Rom. system, but embodied seemingly all that was bad with little that was good in that system. The first four kings of Visigothic Spain after the death of Amalaric, were Arians, and as such were naturally hated by the clergy, but even Christianity does not seem to have extended all over the country. The reign of Recaredo (586-601) is of importance, since the Catholic religion was then definitely adopted by the kings of Spain and Arianism was abandoned. With the reign of Roderic, the Visigothic kingdom came to an end.

The Muslim invasion began in July 711. Tarik, the Moslem general, crossed the straits, landed in the S. of Spain, and straightway defeated Roderic. Reinforcements poured in from Africa, and by 718 the Muslims had reached the Pyrenees. Rapidly they overran the S. of France and penetrated to the Loire, only to be beaten back here by Charles Martel at Poitiers (732). The ease with which the peninsula had been conquered illustrates the anarchy which existed in the country before the invasion. The inhab. of Spain regarded the Muslims simply as the successors of their previous masters; to them it was a matter of indifference whether they were ruled by Muslims or Visigoths. They were at first interfered with but little, they retained their religion, they paid their customary dues, and they were far better governed by the representatives of the caliph than they had been by the Visigoths. But the Muslims who conquered Spain were themselves a mixed race. The Arab and the Berber could not live in peace; the struggles of the Omayyads and the Abbasids tended towards disruption, Arab and Berber fought out their quarrels in Spain, and soon the early anarchy of the Visigothic days returned. This lack of unity among the Muslims enabled the Christian states in the N. to preserve their identity. The 'Reconquista'—the turning of the invading tide—started in Asturias under a chieftain named Pelayo, who after a series of successful encounters with the Moors made a king. The greatest of the Christian kingdoms was Galicia, and it proved the rock against which the Muslim invasion beat in vain. As its pop. increased so did its bounds, and with the increase of Galicia and Asturias (Asturo-Galicia) came the beginning of the struggle of Leon and Castile against the Moors. Gradually Castile became the leading Christian power, and played the greatest part in the reconquest of the country. From the middle of the eighth to the beginning of the tenth century, the rule of the Muslims had been a failure; it had been strong or weak according to the character of the emir. But its strength had been the strength of tyranny and

bloodshed, its weakness the weakness of anarchy. The end of the tenth and the beginning of the eleventh century, however, saw the revival of the power of the Muslims. This increase corresponded with a decrease in the power of the Christians, due to dissension. The reign of Abdurrahman III. was the heyday of Moorish prosperity. He re-established law and order, he gave the country peace, and he reduced even the Christian states to his vassalage. From 912 to 961 he ruled the country with a firm hand, and his reign was both magnificent and just. His son continued the good rule (961-76), but later adventurers and puppets were placed on the throne, and the Moorish Empire seemed on the verge of extinction. It was broken up into small states, and, above all, the Christian states began to revive their power.

Between the years 912 and 1002, the Christian states of the N had been crushed by the power of the caliphs. They had also had a fair share of internal troubles, and so had been unable to check the establishment of strong Moorish power. The Christian states had endured a period of anarchy as bad as that of the Moors, but they emerged from it in a better state than before, and the kings and the people had themselves begun to gain power. When the kingdom of Castile was founded in 1037, it had traditions and laws, and had already granted many of its serfs emancipation, and many of its towns charters. The great model charter of Leon had been granted by Alfonso V in 1020. Sancho the Great of Navarra and his son Ferdinand I did much to unite the kingdoms of the N. Castile, Leon, and Galicia were by this time united as one kingdom, whilst the other kingdoms of the N were regarded as dependences of this larger one. Under Ferdinand began the reconquest of Spain. He advanced as far as the Tagus, threatened Andalusia, entered Valencia, and even penetrated as far as Seville. Ferdinand died in 1067 and his possessions were divided amongst his three sons, but the greatest share of power passed to his second son, Alfonso VI., whose reign is one of the most important in this period of the hist. of Spain. He continued the work of his father with conspicuous success, and by his marriage with a Burgundian princess made Castile a power in W. Europe. Against the Moors his success was immediate, and he overran the whole of Muslim Spain, and even took the tn. of Toledo. The fall of Toledo occasioned the invasion of the Almoravides from Africa and the conquests of Alfonso were checked by the defeat at Zalaca; but, nevertheless, the check was not irreparable, and before his death Alfonso realised that his work was not all in vain. He had to give up some of his conquests, but he kept Toledo, and he had shown that it was possible to defeat the Moors.

The Almoravides were not successful as rulers even at the beginning of their tenure of power. They were more fanatical and less cultivated than the Arabs, and did much to alienate their Christian

subjects, and also their Muslim predecessors. During the next hundred years the reconquest of Spain continued with varying fortunes. In 1230 the crowns of Leon and Castile were finally united and already the various spheres of expansion had been marked out for Castile and Aragon respectively. Castile was to develop to the S; Murcia and Andalusia were to be hers, whilst Aragon was to expand by conquering Valencia and the Balearic Is. By 1248, under Ferdinand III., the Moorish possessions in Spain were reduced to Granada and the ports and hinterland of Almeria, Adra, Motril, and Málaga. There was no longer any danger of Moorish supremacy. The influence of Arab culture, however, was by no means dead. Alfonso X., the Learned, incorporated much that was good from their art, law, and philosophy. He was, however, not a particularly strong king, and the nobles gained some power during his reign. He was succeeded by his son Sancho IV., whose reign was occupied in putting down the revolts of rivals, and was followed by the confusion of two long minorities. The cruelties of Pedro the Cruel, the ally of the Black Prince, terminated in his murder and the records of his reign read much more like those of some oriental despot than those of a Christian monarch. He was succeeded by Henry of Trastámara, king by election. During his reign the power of the Cortes was great, but could not even then check the absolute power of the king. He was succeeded by John I. who claimed the succession to the throne of Portugal, but, defeated in battle, had to give up that claim. His son, Henry III., physically weak, was nevertheless able to restore order to Castile, and was succeeded by his son John II. During the minority of this king, Ferdinand, his uncle, was elected king of Aragon (he was Ferdinand II. of Aragon and Sicily and III. of Naples). The last of Aragon during this period is closely connected with Sicily and Naples. When the throne of Aragon was left vacant, in 1410, Ferdinand, the uncle of the king of Castile, was elected to the vacancy, although the crown should by strict hereditary rule have passed to John II. of Castile.

The separation between the two kingdoms, however, did not last much longer. In 1471 on the death of Henry IV., his sister Isabella claimed the throne of Castile. In 1416 Ferdinand, the uncle of John of Castile, had died, being succeeded by Alfonso V., whose Sp. possessions were ruled for him by his brother John I., who finally succeeded to the throne in 1458 on the death of Alfonso V. His reign was occupied chiefly in war, and he died in 1479, leaving the throne to his son Ferdinand, who in 1469 had married Isabella of Castile. The union of Spain was at last accomplished.

The reign of the 'Catholic' sovereigns, as they came to be called, was the beginning of the greatness of Spain. Her foreign policy made her one of the great European powers. Whilst the later evils of Spain can all be traced to mistakes

made during this period it is none the less true that Spain achieved greatness. The Moors were finally driven out and united Spain was able to proclaim herself the leader of Europe. The lust of Spain after the conquest of Granada is to a very great extent the lust of Europe. The various kingdoms and provinces were united nominally at least under one central authority. The peninsula was rounded off by the final cession of Sp. Navarre to the crown of Spain and gradually the independent Cortes of the various provinces although nominally they still held power became subservient to the central authority. The reign of Ferdinand and Isabella was the beginning of the new period and the discovery of America and the papal division of the sphere of discovery between Spain and Portugal was of vast importance to the new monarchy. The watchword of the new monarchy however was 'Catholicism'. The Sp. kings regarded themselves as essentially the Catholic sovereigns of Europe. Nor was this unnatural, for Spain had vindicated her claim to the title in her long centuries of war with the Muslims and later when Protestantism became a vital force no one had more right to champion Holy See than the Sp. kings.

On the death of Isabella the crown of Castile passed to her daughter Juana who had married Philip the son of Maximilian the German emperor. For a time Castile and Aragon were ruled separately but on the death of Philip Ferdinand again administered Spain and finally on his death left the whole of his kingdom to his daughter and to Charles as regent. In 1516 Charles practically succeeded to the throne of Spain as Charles I. and three years later was elected to the throne of Maximilian and ruled as Charles V. and by this latter name he is best known (see CHARLES V.). During his reign the lust of Spain or at least of the Sp. king is the lust of Europe. The importance of this reign to Spain itself however lies in the fact that during it the royal power was definitely established, the monarchy became wholly despotic and the institutions of the various provinces were practically abolished. Trouble arose with the last remnants of the Moors in the Alpujarras Mts. where they were severely defeated. Charles also attempted to crush them in N. Africa. Here his attempt on Tunis was a success, but he failed to capture Algiers. His love for Italians and the number of them in favour of whom he appointed to high positions in the Sp. court was also a cause of internal trouble and finally worn out by disease and worry, he abdicated. He failed to obtain the election of his son Philip to the empire, that crown passed to his brother, but his hereditary possessions he left to his son who reigned as Philip II. and amongst them he left his beloved Netherlands. The separation of Spain and the empire would have been wholly for good had it not been for the fact that the possession of the Netherlands by the king of Spain was as great an evil. It was now

the policy of Spain to obtain a means of land communication from the Netherlands to the peninsula. To do this the tier of France was threatened the result being that the possession of the Netherlands meant the continued hostility of France. Philip was a man of tenacious purpose, but with little ability save that which came from resolutely holding to his plans. He regarded himself as above all else the Catholic champion of Europe. This position was to him more than to any other king of Spain the keystone of his life's work and he died still pursuing his policy and having ruined Spain in its pursuit. He ruled over the empire of Spain at its greatest. His power extended over Spain, the Netherlands, the greater part of Italy, the whole of S. America, a large part of N. America possessed in the L. Indies and in Africa. He possessed the finest fighting machine in Europe both military and naval. He won the great victory of Lepanto over the Turks. His position in Europe is the greatest in which was unquestioned yet he was broken by his fatal policy in the Netherlands by which he raised up the hatred of France by the cruelties of Alva in Flanders which led to the revolt of the Netherlands and by his quarrel with England which led to the overthrow of the greatest Spanish fleet (the Armada).

The greatest days of Spain were the Philip's death in 1598. The century which followed was a rapid decline. The reign of Philip III. witnessed the final declaration of the independence of the United Provinces. The military lust of the closing stages of the war suggests that Spain finally lost it through lack of resources and not because of its deficiency almost at the end of the struggle she could still win several military triumphs as at Breitenfeld. Philip IV. ruled practically from the beginning to the end of the 17th century. He won a war in which Spain took an active part but in which she received little or no reward. Her soldiers however were still the finest in Europe. By the peace of Westphalia also the independence of Portugal, which had been incorporated with Spain in 1580 and of which the provinces were recognised. The war of France had been steadily increasing during the whole of this period until finally France under Louis XIV. had become the dominant power in Europe. Louis XIV. made no secret of his ultimate hope to become the practical ruler of the peninsula. In the war of the reign of Louis XIV. Spain lost her share but she gained nothing and lost much after each war. During the whole of the reign of Charles II. (1685-1700) Europe waited for the division of the Spanish empire. France, Austria and Bavaria had claims to the Sp. throne. It was known that Charles II. would die childless. Two partition treaties were arranged. The first provided for the accession of the young elector of Bavaria and the two other powers were compensated from the still large dominions of Spain. The second gave the throne to Austria and again

compensated France from the residue of the empire. The Sp. king and people, however, repudiated both treaties, and by the will of Charles II. the whole of the Sp. dominions were left to Philip of Anjou, grandson of Louis XIV., and he was proclaimed king of Spain in May 1700. This led, however, to the war of the Sp. Succession, the beginning of the downfall of the supremacy of France. By the treaty of Utrecht, 1713, all Spain's It. possessions, the Netherlands, Minorca, and

Charles III. were speedily replaced by the royal favourite Godoy, who was greedy and incompetent. On the outbreak of the Fr. Revolution, Spain at first took no part, but finally, after the execution of the king, declared war. She was, however, in 1796, forced to sign a treaty with France by which she promised aid to the Fr. The result was that her fleet was defeated at St. Vincent and her trade practically annihilated. Matters in Spain went from bad to worse, until finally in



W. F. Mansell

1625: 'THE SURRENDER OF BREDA' ('LAS LANZAS') BY VELAZQUEZ
(Prado, Madrid)

Gibraltar were taken from her, leaving her one of the weakest powers in Europe.

The period from the death of Philip V (1746-88) may be regarded as a golden age of Sp. internal hist. Ferdinand VI. (1746-59) and Charles III (1759-88) did their best to initiate wide reforms, to reform the revenues, and to place Spain again upon a satisfactory financial basis. More especially was this the work of Charles III., who may be regarded as one of the benevolent despots of the time. Roads were improved, commerce encouraged, banks firmly estab., and the colonial revenues carefully and wisely superintended.

In 1788 Charles IV. became king, and quickly Spain passed back to the old state of affairs as it had been during the reign of Charles II. The ministers of

1807 a quarrel between Charles IV. and his son Ferdinand culminated in an appeal to Napoleon. Charles and Ferdinand were both summoned to Bayonne, where the crown of Spain was ceded to Napoleon. But the Sp. people recognised only their own chosen king, Ferdinand VII., and the war of Liberation began. Joseph Bonaparte was finally driven out in 1813, together with all the Fr. troops (see FRENCH IN SPAIN).

A constitution for Spain was drawn up in 1812 at Cadiz and Ferdinand promised to be faithful to it. In 1814, however, when he returned to Spain, he was able to restore the old Sp. absolute monarchy.

In 1833 his daughter Isabella succeeded him, and in 1843 signed the constitution of 1836, which had been modelled on that of Cadiz (1812). But the reign

was chaotic, her ministers were weak, and she was not able to keep the country in order. The Liberals were excessive in their liberalism and committed many atrocities. The administration became more corrupt every day and finally in 1868, a large body of republicans having grown up in the country, Isabella abdicated in favour of Alfonso XII, having fled to France.

From 1868 to 1870 a provisional gov. was set up and many experiments were tried in order to bring peace to the country, but the only immediate outcome of this was to supply France and Germany with a *casus belli* for the war of 1870. When Napoleon III refused to admit the candidature of the Hohenzollern Prince Leopold for the throne of Spain, Amadeus I of Savoy was finally elected and he remained in the country for a period of three years, at the end of that time he resigned and withdrew from Spain. For a year Spain became a republic and at the end of that time Alfonso XII was reinstated as king. In 1872 the second Carlist war had broken out and in 1876 it ended with the withdrawal of Don Carlos to France. In 1885 Alfonso XII died and in the following May his son Alfonso XIII was born and was recognised as king, his mother Queen Maria Cristina acting as regent. The country was still however far from being freed from troubles, but the universal sympathy of Europe towards the young king and his widowed mother did much to improve the situation. In 1898 the Cuban question gave rise to the war with the U.S.A. although the immediate cause was the alleged blowing up of the U.S. warship *Maine*. The result of this war was the loss of the whole of the Spanish empire in the W. Indies and Philippines. Spain's navy was destroyed and the huge cost of the war was a very heavy burden on an impoverished country. On May 17, 1902 Alfonso was crowned but the death of his Liberal minister Sagasta in 1903 deprived the country of its political chief. The Conservative leader Cánovas having been murdered some time before.

A host of troubles called for a stable gov. In Catalonia hatred was developing between the Catalan Nationalists and the Radical Centralists led by Lerroux. The Moroccan question however was patched up by a Franco-Spanish treaty (1904) recognising Spanish rights. During the 1900s elections antagonism to the military in Catalonia resulted in the Law of Jurisdiction allowing military tribunals to try offences against military institutions. The power of the military in Spanish politics in which the king concurred was thus increased. The Catalan movement was also intensified. From 1905 to 1907 the Liberals held office. By 1910 Canalejas had come to the front as the Liberal leader. Although a Catholic he curbed the clerical power in Spain, and in Morocco he successfully countered a French military bid for supremacy against which the French also sent the cruiser *Panther* to Agadir. His work towards a settlement of the Catalan question was ended by his

assassination in Madrid by an anarchist on Nov. 12, 1912. Maura, the Conservative leader, was unpopular but a Conservative Gov. was formed by Dato. During the first World War Spain was neutral, being divided between the pro-Ally liberal and clerical left and the pro-Ger reactionary clerical right. The supply of necessities to the belligerents brought prosperity, but Spain lost 140,000 tons of shipping in the course of the war. In Dec. 1915 Dato resigned and the Liberal Count Romanones was Premier until April 1917.

A military bid for power was brewing, pressure being put upon the gov. by the secret military committees of defence, organised by army officers. On Aug. 10, 1917 a general strike aiming at a Socialist Democratic Republic spread over the whole nation. In suppressing it the army became the strongest force in the state. Lerroux, once responsible for Carrer's execution, became as the representative of the military committees, war minister and practical dictator of a new Cabinet with García Prieto as Premier. Carrer's conflict with Spanish syndicalism brought about his downfall. On Dec. 3, 1918 Romanones returned to power and secured the entry of Spain to the Council of the League of Nations. Political chaos was prevalent in Spain. Romanones resigned and the king passed over Dato, official Conservative leader, to make Maura head of a reactionary gov. lasting until July 1919. An enlightened Conservative gov. succeeded under Sáenz de Peña who however was compelled to resign in the following year by the military committees. Political chaos ensued during the next few years and there were several bids to maintain the constitution. But a military revolt broke out on Sept. 1, 1923 under the direction of Gen. Primo de Rivera (q.v.). The gov. resigned. The king who approved the overthrow of the constitution was however forced by the army to recognise a military dictatorship with Primo de Rivera as president.

This dictatorship has been described as a regime relying on force rather than authority, with a strong centralistic tendency, relying on the army, favourable to the clerical party and the church, aristocratic and friendly to big land owners and sympathetic to Catholicism as opposed to syndicalism (i.e. de Madridiagos). The functions of the Cortes were suspended and the control of deputies was left to under-secretaries. Later (1925) raised to the status of ministers. Industry and agriculture prospered under the dictatorship, but not at all. The most commendable policy of the dictator was that of retrenchment in Morocco, showing incidentally that kings could not rule peacefully in Morocco without Spanish help. In Spain the dictatorship depended on a censorship and from 1926 to 1927 on martial law, the beginning of 1927 being marked by an armed attempt by Maura and his followers to gain possession of Catalonia. A royal decree, Sept. 12, 1927, a national advisory assembly was convoked. The Moroccan policy was unpopular in the army which began to

withdraw its support of Gen Primo. The artillery revolted in 1929, headed by Sanchez Guerra, the Conservative leader. The dictatorship brought the throne into such disrepute that the king dismissed Gen Primo (see PRIMO DE RIVERA). A new gov was formed under Gen Berenguer (Jan 30 1930), to return eventually to the constitution. In Dec 1930 a revolution broke out, but was crushed by Berenguer. He had refused to allow the proposed general election to be preceded by municipal elections. The unacceptability of the dictatorship of the latter was that new men would replace the nominees of the dictator. Romanones however did not visualise this danger and advised the new Cabinet formed under Capt Gen Aznar, to hold the municipal elections. These were held on April 10 1931 and resulted in a sweeping Republic in victory. The Cabinet resigned and the king left the country without, however renouncing any of his rights.

A Provisional Republican Gov was set up under Alcalá Zamora head of a Conservative group within the Republican party. On April 11 a Catalan Republic was proclaimed with Col Maria as president. The Provisional Republican Gov was confirmed by the general elections, held on June 28 1931. Over 1000 candidates stood for the 170 seats in the Cortes. The Monarchists were pathetic, the Communists defeated, and the Republican-Socialist alliance triumphant. On July 14 the Cortes began the task of drawing up the constitution completed by Dec. There were many strikes in Spain and Communist riots and in Oct the gov was split upon a vote by which the Cortes favoured the separation of Church and State. Zamora and Don Miguel Maura minister of home affairs resigned and a new Cabinet was formed by Don Manuel Azaña. The republic was strengthened by a special law for its defence passed Oct 20. In Nov (Ximénez de Arriba) was formally outlawed and in Dec 10 Zamora was elected president of the republic.

The Civil War. In the five years between the overthrow of the monarchy and the civil war the second republic was but a parody of democracy attacked with equal rage by right (Monarchist) and left (Communist and Anarchist) extremists. A month after the proclamation of the republic the mob set fire first to the Jesuit church in the centre of Madrid, then to other churches and convents in the city and suburbs. The gov took no effective action, being content to attach the blame not to the mob but to the Monarchists 'on account of their bold and provocative attitude,' an assertion that incited the mob to further violence, and soon churches and convents in most of the large cities of the S were set afire. Azaña, who became the head of the gov. In 1932, introduced to the Cortes the articles of the constitution providing for the expulsion of the Jesuits and the confiscation of their property. By a decree in Jan 1932 the Society of Jesus was 'dissolved on Spanish territory,' and its property taken by the state. Between

1934 and 1936 Spain was under a centre-right gov in which the Catholics, the largest single party, were 'adequately' represented and, like its predecessor it was reformed on six occasions. In the general elections of Feb 1936 carried out under the auspices of a stop gap right centre gov, the newly formed Popular Front were swept into power. Out of 470 seats they held 260 (166 more than after the 1933 elections) the right and centre 214. The new Cabinet under Azaña, consisted entirely of Republic in left and Republic in Union ministers, and some Socialists, Syndicalists, Anarchists, Marxists and Communists. Under this gov however another outburst against the Church, with much destruction of property and lawlessness on a widespread scale took place. The gov was as impotent within the Cortes as without and Spain was rapidly moving towards a condition of complete chaos. Right (mainly Falangists) and left extremists were fighting the issue out in the streets. Two opposite paramilitary formations were being trained the Falangist (in distinctly) Socialists, Communists and others openly.

The civil war began in July 1936 immediately after the murder first of Lt Castillo one of the trainers of the paramilitary formations of the left—and then of the Monarchist leader (Cay) Sotelo. Zamora then becoming first president of the republic in defence of Spain had to invoke the very powers of repression for which his position had condemned the dictatorship.

The hist of the early days of the civil war is obscure, but is carefully prepared was the plan of the insurgents under Gen Franco (qv) that it was almost simultaneous in the garrisons of Sp. Morocco, Madrid, Seville, Málaga, Burgos and Saragossa. It seems that the moderate left leaders were reluctant to meet imminent trouble threatening from right and left but the left wing under Hugo Caballero the Socialist leader expected a struggle and prepared for it while Socialist and Communist youth bodies were organising themselves in paramilitary lines as were on their side but not openly the young Falangists. (Cen Franco) aimed at securing an authoritarian or as his political opponents saw it a Fascist regime.

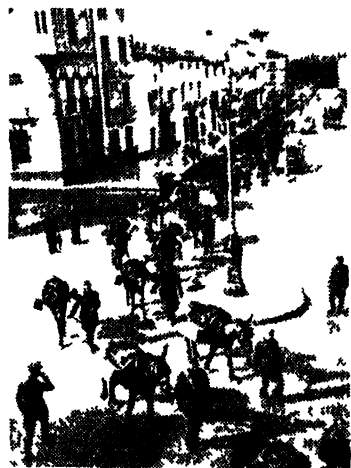
The revolt which heralded the civil war broke out in Morocco (July 18 1936) and fighting soon spread to Cádiz, Seville, Málaga and Saragossa. The Sp Legion held Ceuta and Melilla. Ill armed gov forces in the first two days stormed the Montaña barracks in Madrid. A few days later Franco set up a provisional gov and sent Gen Mola southward to attack the raj. On the heights of the Guadarrama Mts. which encircle the city to the N, the ill armed militiamen held Mola's army and indeed Madrid. The insurgents however, soon took Pamplona, Valladolid, Burgos and Saragossa. Franco brought Moorish troops into S. Spain by air troop carrying planes and swept up to Badajoz. After a fortnight of war the

republicans held S E Spain much of N E Spain and Madrid Barcelona Valencia and Cordova Franco's forces held the rest of the country including Seville the area around Gibraltar and Sp Morocco. Soon the war in the eyes of the rest of Europe assumed the ideological aspect of a conflict between Fascists and Communists and accordingly Ger and It planes and troops were sent to aid Franco. The Br Gov under Leon Blum (q) tended to favour the republican gov but advised neutrality the Soviet favoured the republicans and later sent war material and other but not very effective aid demanding in fact payment in gold for every tank and every plane. The United Kingdom Gov led in the general policy of non intervention and on Aug 4 1936 proposed a five power pact or declaration of neutrality and the Soviet purported to concur in this policy which however was very unequal in its effects for while Britain and France held strictly to the bond Germany and Italy connived at breaking it by sending every material aid to the insurgents which the policy of 'non-intervention' denied to the legal gov.

Insurgent forces now advanced towards Madrid in the N and at the same time bombarded from across the air. Insurgent tanks aircraft and infantry on Aug 26 attacked San Sebastian and from there on Sept 4 and San Sebastian on Sept 12. Meanwhile in the S and W rebel forces were advancing towards the cap and to the relief of the besieged rebel garrison in Melilla. The historic siege of the Alcazar lasted from Aug 1 till Sept 27 when the rebel troops succeeded in recapturing Toledo despite the opening of the Alcazar barracks whereby the republicans hoped to arrest them. The republican gov under Caballero who had succeeded Aznar as Premier moved to Valencia leaving Gen Mola in command in Madrid. The gov forces were now laying siege to Oviedo and the siege was not raised till the end of three months. But the real centre of gravity was Madrid. In Oct the rebels captured sev vils within a few miles of the gov's strongest defences. On Oct 2 Nivolumero the key tn on the road to the cap fell to the rebels and a month later they captured the chief airport of Madrid. Yet despite the entry of rebel troops into University City where Franco's hand in hand fighting took place the city still held out under C. L. who had declared a unified command under him. C. L. as commander in chief Franco might now have taken Madrid had he pressed his advantage but evidently he wished to spare as much of the historic part of the city as possible while at the same time he was aware that his own forces which were largely Moroccan would soon be joined by It and Ger troops. But in the meantime the republican forces were substantially reinforced with the international brigades and so the city was saved from immediate danger. In Nov the Ger and It Gvs informed the Brit Gov that they had accorded recognition to Franco's Gov though they did

not propose to leave the Non Intervention Committee. The Madrid garrison however continued to defy the besieging forces and it was evident that both sides were relying on foreign aid. In fact some 5000 Ger troops had just landed at Cadiz and there were large numbers of Its in Majorca and of internationals, including Russians in Madrid. The Council of the League of Nations supported somewhat platonically the Sp Gov against Ger and It intervention.

Towards the end of Jan 1937 the city of Malaga was bombarded by rebel cruisers with much damage a prelude to the fall of the city on Feb 5. This



New York Times Photo

MALAGA 11 FEBRUARY 1937

Nationalist troops taking an unopposed entry with ammunition and provisions.

was a heavy blow for the republicans and one which apparently reduced their hopes in the whole war.

International interest was now attracted to the naval and military activities in the N where Brit warships showed the rebels that they would permit no interference with Brit ships out of territorial waters. But the running of oil ships to Bilbao was often successful and it was at this time that the Insular ship *Prima* was sunk by a mine soon after this the rebel sent squadrons of Ger planes to bomb the old Basque tn of Guernica. This notorious attack involved the total destruction of the tn with the loss of numerous civilians including many children a prelude to methods employed in the Second World War. The loss of Malaga and the pressure on Bilbao led to the fall of Caballero's gov. A new Socialist gov was formed under Dr Negrin but the effective head was Prieto the defence minister.

The fact that foreign warships were

(carrying out the plan of non-intervention patrol in the territorial waters of Spain was always liable to lead to 'incidents.' On May 29 the Ger. pocket-battleship *Deutschland* was bombed off the Balearic Is. by Sp. Gov. aircraft, and a score of her crew were killed. By way of reprisal, on May 31 Ger. naval forces fired numerous shells into Almería, destroying the harbour fortifications and killing many inhab.

On Aug. 25 Santander was taken by the insurgents, and throughout Sept. and half Oct. the insurgent advance through the N. Sp. provs. continued, until on Oct. 21 Gijón fell, and but for desultory fighting in the Galician Mts., resistance in the N. was at an end.

During the first fortnight of Dec. Franco concentrated large forces once more near Guadalajara for a final assault on Madrid. But on the 17th the republicans stormed and entered Teruel. For a time the long-standing threat to the Mediterranean coast had been removed; but two months later (Feb. 22, 1938) the insurgents recaptured the town and swept towards the coast in the most rapid advance made since their abortive drive on Madrid in the autumn of 1936. The insurgents now decided to strike from Aragón to overrun the S. part of Catalonia. Meanwhile by way of preliminary the Ger. and It. staffs in Spain ordered terror raids against Barcelona on an unprecedented scale. After a month the rebel forces drove a wedge between Barcelona prov. and the rest of republican Spain; and although the republicans still held their own on the l. b. of the Ebro, they had suffered a serious defeat just at a moment when their chances had seemed to improve.

On April 23, 1938, the rebel army launched a major offensive for the capture of Sagunto and the important tns. of Castellón and Valencia, but Castellón only fell after seven weeks and the attack on Sagunto was repelled. During May and June the bombing of tns. and vils. in Catalonia and on the coast to Alicante was intensified. There was often damage done to Brit. merchantmen, until at length the Brit. Gov., after other abortive efforts, succeeded in securing a measure of agreement in the Non-Intervention Committee to bring about the withdrawal of foreign elements from both sides. The republican gov. accepted the plan, but Franco's answer merely served to emphasize his dependence on the Axis. On July 25 the gov. forces relieved the insurgent pressure on Sagunto and Valencia by a surprise crossing of the Ebro over a 100-m. front and the recapture of sev. hundreds of square miles of ter. In Sept. heavy fighting continued in Andalucía and Extremadura as well as in Catalonia and on the borders of Teruel-Valencia, but the position generally appeared to be a stalemate. On Dec. 23, after a great artillery barrage supported by the Ger. 'Kondor' air force and It. 'Legionary Aviation,' the rebel army began its assault along a 100-m. front. By Jan. 21, 1939, it had reached Tarragona and was well on the way to encircling the republican

It. army. Gov. forces began an offensive on the Extremadura and Andalucía fronts as a diversion, but with no success, and by Jan. 25 the Negrín gov. decided that it must leave Barcelona to its fate and try to carry on the war by guerrilla methods in the mts. and valleys of N. Catalonia. Out of an army of 700,000 in all only 200,000 were engaged in this zone, the bulk of the gov. forces being in the central-southern zone pivoting on Valencia. But everything depended on keeping open the sea passage to Valencia against the It. threat by sea and air. It was then that demoralisation set in. The Catalonians were tired of the struggle. Gradually the whole façade of the republican resistance crumbled. Aznar, president of the republic, had fled to France and advised surrender. Gen. Franco confined his activities to the investment of Catalonia, confident of victory. Then, in March Col. Casado, commander of the republican central army, seized power in Madrid and set up a council of defence whose task it should be to end a hopeless struggle on the best terms possible and while the gov. forces were yet intact. Gen. Miaja, who was in command of all the remaining republican armies, was privy to this plan, but was absent in Valencia when the *coup d'état* was effected. The Brit. and Fr. Govs. at once recognised the Franco junta in Burgos.

On March 23 Casado's emissaries flew to Burgos with conditions of surrender. Franco demanded unconditional surrender. Negotiations were suspended, and on March 26 the Casado gov. broadcast an account of what had happened as a preliminary to abandoning the cap. to superior force. Madrid was occupied by the Nationalist (as Franco's forces were now styled) forces on March 29, this final token of Gen. Franco's victory coinciding with the arrival at Cádiz of a further contingent of It. troops.

The material damage caused by the civil war, though severe, was not as heavy as might have been expected. The official inventory listed nearly 700 blown bridges and eleven cathedrals partly or totally destroyed, including the late Romanesque cathedrals of Sigüenza and Lerida, the Gothic cathedrals of Oviedo and Huesca, and the fourteenth-century church of Santa María del Mar in Barcelona. At Toledo the damage was restricted to the Alcázar and its immediate vicinity.

The new regime soon showed that it would have no mercy for its defeated foes. Decrees were promulgated suppressing regional liberties in Catalonia and the Basque provs.; for the restoration to the ex-king Alfonso and his family of their private property; and for reversing the agrarian legislation of the Negrín gov. But the Franco regime was itself faction-ridden and only held together by the solidarity of the army leaders. The freedom of worship won in the nineteenth century was now replaced by the estab. of a state church (Roin. Catholic), with religion subservient to the political purpose of the state. Franco's efforts to

shake off the now unwelcome grip of the Axis powers were unsuccessful and on May 8 he duly subscribed to the anti Comintern Pact (qv) but rejected a proposal made by Count Llano for a formal Sp It alliance. In most respects however, Franco's Spain was modelled on Fascist Italy as a national syndicalist state under himself as El Caudillo (Sp equivalent of Hitler), responsible 'only to God and to history' with power to rule by presidential decree if necessary but with a Cabinet buttressed by the political junta of the National Council a body resembling the Fascist Grand Council of Mussolini's Italy. Serrano Suñer as president of the junta was the most powerful single figure after Franco.

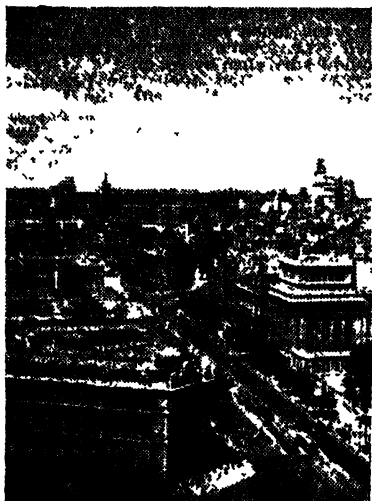
Spanish History during the Second World War—The world war 1939-45 imposed a check on the material progress which might have created a new modernistic Spain. From the beginning of the war Franco's sympathies voluntarily or otherwise were with the Axis powers yet neutrality up to a point was advantageous to both. But to revive the Sp empire with Ger help and so restore the old links with Lat. America was the main policy of the Falange. The Ger's only in the war were it to help Spain in this project, and equally to further Sp expansion in Morocco and N. W. Africa at the expense of France just as they had falsely promised to help Italy's natural claims in Savoy, Tunis and Corsica. In consideration of these liberal promises Hitler expected Franco to allow Ger forces to march through Spain and co-operate with Sp forces in an attack on Gibraltar. Franco's attitude, however, seems to have been an equivocally neutral one not because he had no Fascist ambitions but because he was not sure of his own countrymen or of Spain's resources. When however Germany attacked Russia in 1941 Hitler shelved his contradictory promises in the W because his hands were full in the E. Moreover since he was attacking Russia Spain now was the sole gateway left open for communication between Germany and the outside world particularly to America whence the Ger's obtained information through Portugal and Spain, while the flood of Ger propaganda and instructions to their agents in the Amer. continent passed the same way. Again a non-belligerent Spain was useful for the work of the Sp agents in their Hispanidad crusade in Lat. America a crusade which aimed not so much at unity of political and economic interests between the Lat. Amer. republics and Spain as at building up a bloc to counteract the strong flow of Pan Americanism.

In the spring of 1942, when the Allies, although still on the defensive, were planning the invasion of N. Africa Spain's continued neutrality was essential to the success of this operation. Hence the Allies made every effort to counteract powerful Axis pressure and to discourage Franco from making any flank attack from the Sp peninsula. During 1942 and 1943 Spain was prevailed upon to accord

the Allies a gradually increasing number of facilities. By 1944 it was clear to Franco that as the Allies were winning the war or certainly could not lose it, it was time he heeded their warnings to take stock of Spain's position. It was evident that the new Spain did not stand solidly behind the Falangist party. The party itself had seen its progress sabotaged at least as much from within its own ranks as from without. The conviction outside the party was strong that the Falange could not hope to survive an Axis defeat. This explains Franco's tentative exploration of the possibility of a monarchist restoration. Finding some solution capable of commanding the respect of all men of good will there was only too much reason to fear a second civil war. Some thought this danger could be dispelled by yet another Bourbon restoration. Don Juan the pretender refused collaboration with the Falange and staked his chances on the disappearance of the Franco regime but against him it was not forgotten that during the civil war his services were twice put at Franco's disposal.

After the world war Franco was governing Spain by means of a Coalition held together not so much by a common cause as by common fear. The Falange, the army, the Church, the upper bourgeoisie and the still powerful Ger influence kept together in support of Franco because they were haunted by the spectre of an other revolution in the land. The Caudillo was now developing the Hitlerian attributes of the Fuhrer's last phase: exclusiveness, sudden and unexpected decisions, and the conviction of his divinely appointed mission to save Spain and stay in office. On a slightly lower scale was the Falange, the only political association allowed in Spain. It had now eight members in the Cabinet of thirteen and about 100,000 paid officials ranging from the directors of industrial syndicates to gangsters on the storm troop model. Every industry and business and most individuals paid tribute to it in one form or another and in addition the party received a state subsidy of some £5,000,000. In return the Falange helped to guarantee order in the factories and on the land while a further instrument of power was the police. In short the country was still in a 'state of alarm' not far removed that is from martial law. Some 50 per cent of the whole state revenue was devoted to the services of which nearly three quarters went to the army totals unequaled by any country not at war. But the army was divided. The generals numbering over 600 and the other higher ranks were reputed to be monarchist in sympathy many junior officers were Falangist owing their promotion to the fortunes of the civil war. The rank and file were, generally, passively republican in sympathy. The generals however did little but talk. They might have made an end of the Falange regime but for their fear that the left would rise and sweep away the army influence together with the

Falange. The Church, too, was in definite alliance with the regime, despite its previous varying policies, and it shared much of the popular hatred of the Falange and feared a popular uprising much as did the generals. In this dilemma the Church leaders had become the champions of the so-called 'evolution of the regime' into an authoritarian constitution mitigated by a tamed social democratic opposition. The Catalan industrialists, once the pillars of the republic, disliked Franco, but, like the industrialists in Spain, realised that he kept the workers in their place and so guaranteed them their privilege and profit.



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MADRID: CALLE ALCALÁ

The fact that Franco has maintained his position in Spain so far is a proof that at the time of his intervention the politics of Spain had sunk to the lowest level of embittered strife. The great majority of Spaniards say now that 'there is nothing and no one to put in the place of Franco.' The meaning of this is that the Spaniards would prefer to see the democratic regime restored, but they realise that there are no leaders they can trust, whilst the return of the Bourbon monarchy makes no appeal.

In the field of reconstruction and social service, progress was made after the civil war. By 1949 there were no longer 'devastated regions,' because at a cost of £30,000,000, the full original estimate of the losses, the state had rebuilt almost 20,000 ruins, including 16,753 cottages and flats, 1276 religious edifices, 338 clinics and welfare centres, 231 schools, 70 barracks, and nearly 100 tn. halls. Vill. of all sizes that suffered heavily during the civil war have been

completely rebuilt, and those responsible for the replanning have shown good taste by keeping to that traditional type of architecture which flourished in the sixteenth century and of which the Escorial and sev. buildings in old Madrid are examples. The anti-tuberculosis campaign has resulted in the building of sev. modern sanatoria, and the monuments and buildings of national interest have acquired special importance, and preservation and excavation works are in progress in many of them. Between 1944 and 1949 sev. important water reservoirs were completed and many others are in course of construction. The Franco Gov. followed the policy called 'hidráulica' initiated during the monarchy under minister Gasset, and all possible sites were exploited in order to irrigate big extensions of land now under dry farming. Reconstruction and social reform, and the introduction of modern sanitation and labour-saving devices, are slowly raising the standard of living of the Sp. people, though great contrasts of wealth and poverty remain.

LANGUAGE AND LITERATURE. — The written Sp. language as it is known to-day, and in which the literature and culture not only of Spain but of all the countries of Sp. colonisation have suitable expression, is based on the anct. dialect of Old Castile, and termed *castellano* or Castilian. It belongs to the main branch of the Romance languages (*g.r.*); it is not the only language spoken in Spain: Catalan (*g.v.*), another member of the Romance languages, is spoken in E. Spain. Galician, also a Romance language, strictly allied with Portuguese, is spoken in the N.W. corner of Spain, and Basque, of uncertain linguistic affinities, is spoken in the N.E. corner of Spain (and the S.W. corner of France). On the other hand, of W. European languages, Sp. ranks next to Eng. in the geographical extent of the countries in which it is used. There are about 109,000,000 speakers in Europe, America, Africa, and Asia; they are distributed as follows: Europe, over 28,000,000; N. America, about 22,000,000; Central America, about 15,250,000; S. America, about 43,250,000; Africa, about 1,750,000; Asia, about 750,000.

Castilian arose from vulgar Lat. spoken in Rom. times in the central region of Spain (the anct. country of Castile), and already in the tenth or eleventh century it was a written language, although the earliest preserved literary documents belong to the twelfth century. Early Sp. owes very much to Alfonso el Sabio (thirteenth century), to Don Juan Manuel and De Ilitia (fourteenth century). In 1492 Antonio de Nebrija pub. the *Gramatica de la lengua Castellana*, which may be considered as the first modern grammar of any language. In the Middle Ages various Romance languages and dialects were spoken in Spain: Asturian, Leonese, Navarro, Aragonese, Mirandese, Gallego (or Galician), and Valencian, besides Portuguese and Catalan. By the fifteenth and sixteenth centuries Asturian, Leonese, Navarro, and Aragonese

were absorbed by Castilian, while Portuguese more or less absorbed the W. dialects, and Catalan the E. ones.

In the sixteenth and seventeenth centuries Castilian had the literary hegemony not only in Spain but in the whole S.W. of Europe, it has already been identified with Sp. (*Español*). At the end of the seventeenth century, however, began its decadence from the European literary hegemony, but the foundation of the Sp. Academy, in 1714, contributed to fix the language and to prevent its corruption.

The Sp. used in the various countries of Lat. America has local peculiarities (Mexican, Chilean, Argentinian, etc.) of pronunciation, grammar, and vocabulary. These differences, while interesting and striking, are not as fundamental as those found in some other languages. Moreover, sev. of these Sp. Amer. peculiarities are current in Spain itself (mainly in Andalusia), and had probably been imported into America by the Sp. settlers from their places of provenience.

Judeo Sp. or Juderino, also called Sephardic (*Sepharad*, in Heb. means Spain) or Ladino (from Lat.), is the Sp. counterpart of Germanic Yiddish (*qv*). It is still spoken by the descendants of the Sp. Jews (who were expelled from Spain in 1492) scattered in some Mediterranean countries. Juderino contains many Heb. words and has also absorbed many words from Arabic, Turkish, and Grk., but is principally based on Old Castilian (as spoken until the fifteenth century). The linguistic importance of Juderino is very great as it preserves certain peculiarities of Old Castilian which have disappeared from modern Sp. (e.g. Juderino still uses *f* where Sp. employs *h*, *ferrir* for *herir*). There is a comparatively rich literature in this language, which also preserves certain Sp. literary works which have disappeared in Sp. Juderino employs the Heb. alphabet (slightly modified) and, like Heb., reads from right to left.

Juan Ruiz, best known as the arch priest of Hita (b. about the end of the thirteenth century), wrote *Libro de los Cantares*, a collection of verse and the most original work of all the earlier period of Sp. literature. His writings are very valuable as a realistic picture of the life of the times. At the end of the fourteenth century the It. and Provencal influence became strong to the detriment of Castilian literature. During this period, however, one writer of note, Pero López de Ayala, followed the national tradition. As official chronicler he wrote the hist. of his own time (the reigns of Pedro I., Enrique II., and Juan I. of Castile). His *Remado de Palacios* is an eloquent poem of disillusion.

The romances of chivalry, though not peculiar to the country like the chronicles and ballads, attained great popularity in Spain during the end of the fourteenth and the fifteenth centuries. The best of these books in Castilian was the *Amadis de Gaula*, the source of which is uncertain.

Cervantes (1547-1616) clears the road in more senses than one to what is indeed the Golden Age of Sp. literature with

names such as Lope de Vega, Tirso de Molina, and Calderon. Mention must be made of the mystic and religious writers. Santa Teresa de Jesus (1515-82), who tells with admirable simplicity her life in *Libro de su vida*; Juan de Avila, friend and religious adviser of Santa Teresa, and the author of sev. moral and theological treatises (*Cartas Espirituales* is the most remarkable); Fray Luis de Leon (d. 1591), who wrote lyrics which entitle him to rank as a great poet; Fray Luis de Granada (d. 1588), a great preacher and theologian who wrote *Guia de Pecadores* and *Oraçion y Meditacion*—the book by which he is best known is *Perfuta Casada* (Perfect Wife), and San Juan de la Cruz (d. 1592), who wrote three perfect examples of pure mystical poetry, *Noche oscura*, *Cántico Espiritual*, and *Llama de Amor Viva*. The 'cloak-and-sword' drama predominated with the works of Calderon, Tirso de Molina, and Lope de Vega. Diego Hurtado de Mendoza and Juan de Mariana were historians (*Guerra de Granada* and *Historia de España*, respectively), Francisco de Quevedo excelled as a satirist, and Baltasar Gracian, with his *El Criticón*, established himself as a philosophical writer.

The Golden Age ends with Calderon and for some seventy-five years Sp. literature greatly declines. The Romantic movement was initiated at the time under the influence of foreign writers (Byron was one of them), and, as the century proceeded, and after Leandro Fernandez de Moratin (d. 1828) wrote *El Si de las Niñas* under the inspiration of Molière, there was a real Romantic revival with writers such as the poets Quintana and Espronceda, and the melodramatist Duque de Rivas, with his famous *Don Alvaro*. Towards the end of the nineteenth century Zorrilla provided himself a great dramatist with his *Don Juan Tenorio*. José de Larra (1808-1837), was a litterateur of contemporary manners. The revival of the novel of custom, the chief glory of Sp. literature, is largely due to Cecilia Böhl von Faber (1796-1877) who wrote under the name of Fernan Caballero. The novel, however, took a more realistic turn with the work of Valera (1824-1905) and Alarcón (1833-1906), until with J. M. de Pareda, considered one of the greatest of Sp. novelists, a full return to the traditional Sp. realism was made. Born in Santander, he is the 'regional' novelist of the N. of Spain, while the novelist of Madrid is par excellence Perez Galdós (qv) (1842-1920). Galdós was influenced by Dickens in early life, and his work divides into historical novels and contemporary social novels. Fr. naturalism was disintegrating the Sp. novels into a host of details, but the naturalist and 'regionalist' novels of Galician life by De Pardo Bazan (1851-1921) are noteworthy. Other naturalist novelists are Valdes of Asturias (b. 1853) and Blasco Ibañez of Valencia (1867-1928). Ibañez has been called the Sp. Zola, but after a period of political work he wrote crude melodrama with popular success.

The novel is the chief feature of modern Sp. literature. Also notable are the

vigorous works of Miguel de Unamuno (1864-1939) (*Sentimiento trágico de la vida; Vida de Don Quixote y Sancho*); those of Pío Baroja (b. 1872), whose *Idilios rascos* so well reflect the atmosphere of his native Vasconia; and the classic unmodernistic work of Ricardo León (1877-1940), author of *Casta de hidalgos*. Some foretaste of 'modernism' is to be found in the poetry of Campoamor (1817-1901), Núñez de Arce (1833-1903), Gustavo Becquer (1836-70), Rosalía de Castro (1837-85), and Salvador Rueda (b. 1861). The artificial prose of Ramón del Valle Inclán bequeathed a model of the *genre* in his four *Sonatas* and provoked a reaction initiated by a distinguished essayist and novelist, 'Azorín' (b. 1874). Azorín was a leading spirit of the rebellious and reformative generation of 1898, which included Unamuno and Baroja. This *renacimiento* spirit was taken up by Juan Ramón Jiménez (b. 1881) and Machado (b. 1873), leaders and inspiration of poets such as Federico García Lorca, Dámaso Alonso, Rafael Alberti, and Pedro Salinas. Two Castilian poets of a severer discipline are Gabriel y Galán (1870-1905) and Enrique de Mesa (1879). J. J. Llovet (b. 1895) is a reactionary against 'modernism.' Concha Espina (b. 1879), who has psychological perception and whose works include *La Nina de Luzmela* and *La esfinge maragata*, was awarded literary prizes of the Academia de la Lengua, and was a candidate for the Nobel prize in 1934. Ramon Perez de Ayala (b. 1880) is a novelist, critic, and poet. His poems include *La Paz del Sendero*, *El Sendero andante*, and *El Sendero innumerable*; his best novels are *Prometeo*, *Belarmino* y *Apolonio*, *Tigre Juan*, and *Las Máscaras*. Other writers are Gabriel Miró (1879-1930), whose best works include *El Humo Dormido* (1920) and *El Libro de Sigüenza* (1921); and Salvador de Madariaga (q.v.) (b. 1886), notable for his able works on the *Rise of the Spanish American Empire* and *The Fall of the Spanish American Empire* (1946-48).

In Sp. drama Jacinto Benavente (b. 1866) is perhaps the outstanding figure, whose best-known plays are *Los Intereses creados* (1907), the tragedy *La Noche del Sabado* (1903), and *La Malquerida*. Mention must be made of the Quintero brothers (q.v.), whose many jointly written comedies include *Las de Caín* and *Puebla de las Mujeres* (1912); Ramon del Valle-Inclán (1870-1936), also known as a short-story writer; Linares Rivas (b. 1867); and Joaquin Goyan (b. 1877), whose play *El Conde Alarcos* (1917) is known outside his own country; and Don Gregorio Sierra (b. 1881). See also DRAMA, *Spanish Drama*.

Though the last few years have been markedly sterile, mention must be made of José María de Cossío (b. 1893), who has written a voluminous story of bull-fighting, *Los toros: Tratado técnico e histórico*; F. García Sanchiz (b. 1887), author of *El viaje a España*; Ramiro de Maeztu (1876-1936), *Don Quixote y la Centinela*; Julio Camba (b. 1884), *Londres, La rana viajera*; Ramón Gómez de la Serna (b.

1888), *Greguerías, La viuda blanca y negra*; Wenceslao Fernández Florez (b. 1885), *Las siete columnas, Las gafas del diablo*; Ortega y Gasset (b. 1883), *España invertida*; *Meditaciones del Quixote*; and Eugenio D'Ors (b. 1882), *Crítica de Pablo Picasso Tres lecciones en el Museo del Prado*.

MUSIC.—There is a Sp. music of marked style. The inspiration of most Sp. composers is folk music. Modern composers of note include Granados, Albizu, Falla, Turina, Pablo Casals, Andres Sogovia, and Nin.

Art.—See SPANISH ART.

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Spain, Bank of (Banco de España), limited liability company incorporated in S. The old bank of that name, which was founded in 1829, was reconstructed in 1874, when the right to issue notes was temporarily suspended. In 1922 the Bank Ordinance Law provided for gov. participation in the net profits. The monopoly of note issue was prorogued to Dec. 31, 1946. Capital increases are now authorised up to 250,000,000 pesetas. In 1948 its gold holdings totalled over 25,266,000,000 pesetas (gold), valued in 1,216,000,000 pesetas (paper).

Spalato, see **SPLIT**.

Spalding, mktl. tn. and urb. dist. in the centre of the Parts of Holland, Lincolnshire, England, on the Welland, 14½ m. S.W. of Boston. There is a thirteenth-century par. church, and a grammar school founded in 1567. The tn. grew up around a priory. S. is an horticultural and agric. centre; tulips and daffodils are grown in great quantity, and there are manufs. of agric. implements and tractors. The tn. is a railway junction. The Spalding Gentlemen's Society is the oldest antiquarian society in Eng. land. Pop. 14,200.

Span, measure of length taken from the stretch of the fully opened hand from thumb to little finger. This space averages from 9 to 10 in.

Spandau, bor. of Berlin, at the confluence of the Havel and Spree, fortified in the fourteenth century, and having a sixteenth-century citadel, with the Julius tower. Products include metal goods and textiles, and there is a harbour. S. was a former arsenal and arms centre. Pop. 147,400.

Spandrel, in architecture, the space over the haunch of an arch and between the 'extrados' (upper surface of the arch ring) and the dripstone. The S. or S-wall fills in the sides of the arch and is continuous upwards with its face.

Spaniel, important group of dogs characterised by large, pendulous ears and long, silky hair. The Clumber S. takes its name from Clumber, near Worksop, England, a seat of the dukes of Newcastle, one of whom introduced it from France. It is white, with lemon markings on the head and ears; is massively built, weighing up to 75 lb., with a large head, heavy brows, long body, short and thick legs, and long and dense coat. Though rather slow, it is an extremely intelligent gun-dog, and does not give tongue. The Cocker (q.v.) averages only about half the weight of the Clumber. It is a very useful dog for working hedges and driving game from low coverts. Its name is derived from having been largely used for woodcock shooting. The Springer is, next to the Cocker, the most popular of sporting S. It is larger than the Cocker and has a longer body; the colours most favoured are liver and white, and black and white. The Welsh Springer is smaller than the Eng. variety, and in colour is dark rich red, and white. The Field S. was formerly only black, but is now bred in other colours, including black and tan,

red roan, blue roan, and liver and white. Though a reliable worker with the gun it is bred more for exhibition than other sporting S., and the tendency has been to lengthen the body and shorten the legs to an extreme. The Norfolk S., a variety of the Field S., is a very active, useful sporting dog. Its colour is black, liver, yellow, and white. The Irish Water S. is markedly different from the other varieties. The colour is a rich, dark liver, and the coat is composed of short, crisp curls; the ears are long, and set on low. It is a wonderfully intelligent and plucky dog, taking to water like a duck. The Sussex S., probably the oldest variety, is a rich golden liver colour, and the coat is dense



T. Fall

KING CHARLES SPANIEL

and perfectly straight. It is smaller than the Clumber, but has great length of body. It gives tongue and is rather slow, but a very reliable worker. Toy S. have long been kept as pets, and have much to recommend them. Of these, the King Charles (q.v.) has four sub-varieties: black-and-tan, ruby, tri-coloured (Prince Charles), and Blenheim (q.v.). Other toy breeds are the Jap., white in colour, marked with black or red, and having sev. features in common with the Pekinese (q.v.), a very popular breed.

Spanish-American Literature. During the sixteenth century Spain had an imposing array of conquistadores, and men of letters and artists. The material conquest of the Amer. continent was closely followed by the spiritual domination, initiated by the rapid spread of the Sp. language.

Early S.-A. L. includes the *Cartas de Cristóbal Colon* describing the contact of Columbus with a new world. The *Cartas de Relación* (1519-26) of Hernán Cortés

(1485-1547) are five reports of his conquest of Mexico. Bernal Díaz del Castillo, however, was the first chronicler to write in a definite literary style, and his *Verdadera Historia de la Conquista de Nueva España* is a vivid document on the conquest of Mexico. Of great interest to historians, if not so much to men of letters, are the writings of some of the warriors and adventurers who completed the conquest: Alvar Núñez Cabeza de Vaca (q.v.) (1490-1564), *Naufragios y comentarios* (1542); Gaspar de Carvajal (1504-84), *Descubrimiento del Río de las Amazonas* (pub. in 1894), a striking narrative of adventure, Cieza de León (1519-69) *Historia del Perú* (1553) Alonso de Góngora Marmolejo, *Historia de Chile* (1575) (Marmolejo served as a soldier under Valdivia (q.v.), the discoverer of Chile). Of special literary merit is *Verdadera historia de la conquista de la Nueva España* (1552) by Bernal Díaz del Castillo (1492-1584). The conquistadores were followed by monks and priests who accomplished the spiritual conquest of the terra added to the Sp. crown. Fray Bartolomé de las Casas (1475-1566) did not spare the warriors and adventurers, as shown in his notable work, *Brevísima relación de la destrucción de las Indias* (1552), while Cristóbal de Molina (†1578), a monk who went with conquistador Almagro, relates the epic of the discovery of Peru in his *Relación de la conquista y población del Perú* (1552).

The second generation of Sp.-Amers inherited the literary tendencies of the conquistadores. Creoles, half-breeds, and even pure natives became chroniclers of the conquest, mainly from the point of view of the conquered. Hernando de Alvarado, the son of an Aztec emperor, wrote *Cronica Mexicana* (1598), and Fernando de Alva Ixtlilxochitl, the *Historia de los chichimecas*. Recent research has shown that the colonial period is of great importance from both the historical and the literary standpoints, and amongst the native chroniclers the famous Inca Garcilaso de la Vega (1539-1615) the son of a Sp. conquistador and a princess of the Sun. Isabel Chmupa Ocllo went to Spain, where he wrote *La Florida del Inca o la Historia del Adelantado Hernando de Soto* (1605), and his masterpiece, *Comentarios reales* (1609), the last of the Inca Empire.

The epic of the *Conquista* inspired poets such as the Spaniard Alonso de Ercilla, whose *La Araucana* (1569-59) is based on his adventures in Chile. This is the first work of real literary merit in Sp. produced in America. The Chilean Pedro de Oña imitates Ercilla in his *Arauco Domado*. Dr. Martín del Barco Centenera pub. in Lisbon (1602) *La Argentina y Conquista del Río de la Plata*, a work rich in valuable information. The deeds of Cortés found their epic poet in Antonio Saavedra Gusmán, who wrote *Peregrino Indiano* (1599). The first native-born poet of México was Francisco de Terrazas: a few stanzas only are preserved of his *Nuevo Mundo y Conquista*. Gabriel Lasso de la Vega wrote *Cortés Valeroso* (1588). The Peruvian Pedro de Peralta (poet laureate

of the viceroys) wrote *Lima Fundada o Conquista del Perú* (1732), and Fray Diego de Ojeda *La Cristiada* (1611). Sor Juana Inés de la Cruz, a notable figure of the colonial period and a great bibliophile with a library of 4000 vols., was a poetess whose poems are collected in *Inundada Castañeda* (1698). She wrote also a religious play, *Auto da Sacramento del divino Narciso*. The eighteenth century is barren in literary work of merit, but in Sp. America there was much scientific investigation in all depths of natural hist. and physical geography. In 1776 the viceroyalty of what is to day Argentina was established and the viceroy, Vértiz (1778-1781) founded the first printing press.

The end of the eighteenth and the beginning of the nineteenth centuries saw the dawn of the movement for independence, the movement of Creoles and half castes against oppression and privilege which in course of time ended with the creation of twenty independent nations. Writers of this period draw inspiration not only from the Fr. revolutionary authors but from the more liberal minded Sp. contemporaries. The Ecuadorian José Joaquín de Olmedo (1780-1874), wrote *La victoria de Junín: canto a Bolívar* (1825), and he also trans. into Sp. Pope's *Essay on Man*. The Cuban José María de Heredia (1803-39), left many works of merit, both in Sp. and Fr., his *En el Trocadero de Cholula* (1850) anticipated by ten years the appearance of Romanticism in Spain, and his *Oda al Niagara* has special merit.

Romanticism flourished in Sp. America at the time of the war of independence against Spain. Domingo Faustino Sarmiento, the vehement publicist, advised his compatriots to turn their backs once for all on Spain and seek inspiration in their native land. Much of his writing appeared in the daily *El Mercurio* of Valparaíso. His main work is *Facundo o civilización y barbarie* (1845). Esteban Echevarría (1805-51) introduced Romanticism into Argentina with *Llura o la noria del Plata*, *Los consuelos*, and *Rimas*. Juan Marmol (1817-71) wrote against the tyrant Rosas, his best work, *Amalia*, is of great historic interest. The masterpiece of this period, however, is *Maria* by Jorge Isaacs (1837-95). Juan Zorrilla San Martín (1855-1931) a native of Uruguay and author of a novel in verse entitled *Tabaré* (1888), is considered the greatest romantic poet of Sp. America. The influence of Sp. authors such as Galdós and Pereda is felt in the works of José López Portillo (1850-1923) in *La Parcela* (1898), and in Rafael Delgado's *La Calandria* (1891). The Sp. tendency is dominant in the writing of the Peruvian Ricardo Palma (1833-1919), whose *Tradiciones Peruanas* (10 vols., 1872-1908) is his chief work. Towards the end of the nineteenth century a new modernistic tendency is found in Sp. America and for the first time Sp.-Amer. writers make their contribution to world literature. The book that heralded the transition was *Antel*, a vol. of verse by the Nicaraguan Rubén Darío (q.v.) (1888). The Colum-

bian, José Asunción Silva (1865-96), who took his own life at thirty one, had as models Poe, d'Annunzio, and Baudelaire. His most important work is the poem *Vocativo III*. Amado Nervo, a Mexican left amongst other work *Infamidad*.

The period of modernism is followed in Sp. America by *el modernismo* that is to say, a period during which the inspiration is the New World itself as against exotic inspiration. The Mexican Enrique González Martínez (b 1871) wrote *Silencio*, *Los senderos ocultos* and *La muerte del cisne* (1915). The Argentinian Leopoldo Lugones (1874-1938), *Las montañas del oro* (1897), *Los crepusculos del jardín* (1905) and *Lunario sentimental* (1909). His verse is realistic. The Peruvian, José Santos Chocano (1875-1934), a true romantic wrote *Los caballos de los conquistadores*, *Alma America* and *Lat Iuz*. The most notable poetess the continent has produced is Gabriela Mistral (b 1889) a Chilean whose *Desolacion* a collection of prose and verse, made her literary reputation besides winning for her the Nobel prize (1945). The Uruguayan José Enrique Rodó (1872-1917) was an outstanding essayist though his best work is *Ariel* (1900).

Contemporary realistic novelists include the Chilean Alberto Blest Gana (1830-1920) author of *María Rita* (1862) and *Durante la Reconquista* (1897) the Colombian Tomás Carrasquilla (1851-1941) with *Frutos de mi tierra* and *La marquesa de Tolombó* (1924) and the Mexican, Federico Gamboa whose *Santa* was pub. in 1903. As regards the novel of the cities, in general the themes are based on the sordid side of city life, brothels, tenement houses and the port side. The Argentine Manuel Gálvez (b 1882) is one of the best novelists of his country and of Sp. America as a whole. Of special interest is *La masera normal* (1914) whilst *Nacha Regules* (1919) describes the miserable life in the brothels of Buenos Aires. Joaquín Edwards Bello (b 1884) handles in masterly manner the life of the *rolo* (down and out under dog) of Chile in his well known book *El rolo* (1920) and also in *La cuna de la inercia* (1918). Of peasant novel Caro Azúa (b 1908) a Peruvian has achieved with his *El mundo es ancho y ajeno* (1941) a picture rich in colour and strength, reflecting the destruction of a native vil in the wake of industrialism. Perhaps the most distinguished among the novelists of Sp. Amer. culture is Enrique Larreta of Argentina, who has interpreted the Sp. spirit in his famous novel *La gloria de Don Ramiro* (1908), a story dealing with eighteenth century Lima. The Uruguayan, Carlos Reyes (1868-1938) finds his inspiration in Spain with *El embrujo de Sevilla* (1921) and wrote under the influence of Zola his *Beba* (1919). The Chilean D'Hulmar (b 1880) in his *Pasión y muerte del cura Duesta* (1921) shows his great love for Seville.

The 'Gauchesca' Literature.—The Sp.-Amer. writers have interpreted the native folklore mainly around the 'gaucho'—a wide definition of the type being 'a native

of the La Plata pampas of Spanish Indian descent cattle men who mostly live and work in the country'. Having in mind that La Pampa reaches from the W. to the L. Atlantic and from Bolivia, Paraguay, and the Gran Chaco to Tierra del Fuego, it can be understood that the *gauchesca* literature has a vast background and is by no means peculiar to Argentina. But the Argentinian Sarmento with his *La cuna* (1845) opened up this interesting field whilst Robert Cunningham Graham and W. H. Hudson followed suit both in the Sp. and Eng. languages. In epic verse three poems are noteworthy: *Santos Legas* by Asubí, *Lausto* by Estanislao del Campo and the great Argentinian classic *Martín Fierro* by José Hernández. Gualle (1896-1927) with his *Don Segundo Sombra* produced the best *gauchesca* interpretation in novel form.

See I. B. Llos, *La vida cultural de la colonia* (Lima) 1909, E. G. C. Alden, *Latin America* 1913. A. Coster, *The Literary History of Spanish America* 1916, B. Moses, *Spanish Colonial Literature in South America* 1922. J. Barrera, *Historia de la Literatura Hispánica* 1931 (Quito) 1935. A. F. Riosco, *La literatura Iberoamericana* (Buenos Aires) and J. R. Spell, *Contemporary Spanish American Fiction* 1935.

Spanish-American War, The, was the outcome of the conditions set up in Cuba by the political discontent in the island during the whole of the nineteenth century. War broke out in Cuba in 1898 through the refusal of Spain to accede to plenty necessary reforms and lasted three years. It was succeeded by a period of peace but in 1895 the Cubans again revolted. Amer. interests and commerce in the island were in danger of destruction, and as the U.S.A. also viewed the plight of the Cubans with sympathy the U.S. Gov. urged Spain to terminate the war and establish civil gov. in Cuba. However, before any action had been taken by Spain on Feb. 15 1898 the U.S. battleship *Maine* was destroyed by an explosion in Havana harbour with a loss of 266 lives. Public opinion at once accused the Sp. officials and a resolution was passed by Congress declaring Cuba independent and empowering the president to make Spain relinquish her claims over the island. An ultimatum to this effect was sent to Spain, fixing April 23 as the last date for submission. Spain declared war formally on April 24.

On April 22 Rear Adm. Sampson began the blockade of Havana and the U.S. fleet of Cuba with his N. Atlantic Squadron. Meanwhile Adm. Dewey, who had been stationed at Hong Kong with the Amer. squadron, was ordered to begin operations and sailed to Manila Bay in the Philippines. He gained a complete victory took possession of Cavite and awaited the arrival of a land force to capture Manila. The troops, however, did not surrender until Aug. 13. About the same time the Sp. admiral Cervera, had left the Cape Verde Islands en route for Santiago, where he arrived on May 19. Strict watch was kept by Sampson to prevent the escape of

the enemy, and the *Merrimac* was sunk at night to block the Sp. squadron in the harbour, but the ship drifted too far to prevent Cervera's exit. On June 21 Maj.-Gen. Shafter arrived off Santiago, and successfully landed his troops at Baiquiel, and three days later the Spaniards were driven back from Sevilla. Gen. Shafter then began his attack on Santiago, whither the Spaniards had retreated, San Juan being captured by the Amers. Operations began on July 1, and on July 4 the city was summoned to surrender, but without success. In the meanwhile Adm. Cervera's squadron had been ordered to

Gk. and Phœnician merchants, Rom. builders, Visigothic Byzantine gold and silversmiths, Lombard and Fr. masons, It. painters, and Flem. sculptors who worked in the peninsula, taught the Spaniards, but the strong individuality of the latter imparted a typical trend to the arts, giving them what may be described as a Sp. character.

Architecture.—The Visigoths found in Spain much degenerate Rom. architecture, mostly of a military character, and introduced a Byzantine element, thus creating a Rom.-Byzantine style, somewhat ostentatious, mainly in religious buildings.



SEVILLE CATHEDRAL

E.N.A.

The main body of the cathedral was built between 1402 and 1519. On the right is the Giralda tower, a combination of European Gothic, Mozarabic, and Mudéjar styles.

sea by the Madrid Gov. He accordingly left Santiago harbour, and suffered defeat at the hands of Sampson; his squadron was destroyed, and he himself wounded. After this Santiago surrendered, July 17, and Spain sued for peace. It was arranged that Spain should evacuate Cuba, should cede Puerto Rico to the U.S.A. as well as her is. in the Antilles, and one of the Ladrões, and should leave Manila in the possession of the U.S.A. In 1899 a treaty was signed, and Spain evacuated Cuba, the Philippines, and other is., receiving an indemnity of \$20,000,000. See R. Titherington, *History of the Spanish-American War*, 1900.

Spanish Art. The artistic culture of the conglomeration of races we now call the Sp. people is the result of the different influences exercised over the native stock by the colonisers, invaders, and others.

There still exist in Spain a number of churches and monasteries of the period, such as the basilica of Santa Leocadia, baptistery of Merida, the church of San Martin, Orense, and the crypt of the Palencia Cathedral. During the reconquest of Spain from the Arabs, the Rom. Visigothic architecture degenerated, whilst new elements began to show themselves. The work of Lombard and Norman builders, who found their way into the chief Christian kingdoms, developed changes due to the marked individuality of the inhab. of those kingdoms. Towards the beginning of the eleventh century the Rom.-Fr. trend marks a new departure, an interesting example of this being the basilica of San Salvador, Oviedo, and the church of San Pedro y San Pablo, in Lena.

The Arabs were creating in the part of

Spain they occupied an architecture of their own strong in character at first as witness the mosque of Córdoba, and effeminate afterwards as may be seen in the Alhambra of Granada. As the Spaniards (Castilian, Leonese and others) advanced into Arab land the architecture was influenced by the builders and workers who remained in the reconquered territory and thus the peculiar Moorish style was created (the Mozarabs were Christians who had been under the Arabs and who learned the art of building from their masters). A good example is the church of Santa María de Lebeña Asturias. Towards the end of the eleventh century many friars and pilgrims crossed the Pyrenees making their way to the sepulchre of Santiago in Galicia. No better example can be mentioned of their influence in architectural styles than the Santiago de Compostela cathedral and the church of San Pedro de las Dueñas, Leon. The foreign influence is well shown in the Gothic cathedrals of Burgos and Toledo. The Mudéjar (Moorish subjects of the Christian kings) also helped to create a unique style, a beautiful example of which is the famous Giralda tower of the cathedral of Seville. This mainly fifteenth century cathedral shows the blending of influences with Gothic creating a distinctive Sp style.

In the modern age after the discovery of the New World the Spaniards return to architecture to the classical Greco-Roman style as exemplified by the palace of Madrid, in Cogolludo, Guadalajara (1600) and the Hospital Mendoza, Toledo in which however can be seen a strong Hispanic tendency. Under Charles I and Philip II this tendency is still more pronounced and the Leonal is a magnificent example of singleness of purpose expressed in straight lines and a grandeur of proportion, a cold but magnificent style that fits perfectly into the background of the Sp lust of the time. The greatest architects of the period are Herrera and later on Churriguera. Then was created a genuine Sp style which in spite of the baroque influence imported during the time of the last kings of the Austrian dynasty and the first Bourbons, persisted and flourished again under Charles III.

As regards the twentieth century Sp architecture shows little of note. In Catalonia there have been attempts at extravagant modernism such as the cathedral of the Sagrada Família in Barcelona. But it is interesting to note that under Franco's regime architecture derives much of its inspiration in the Sp style created by Herrera and his followers.

Sculpture. Of interest are some of the Sp romantic wooden and stone sculptures prior to the Arab invasion, the best of which are to be found in Catalonia. The sculptor Bermejo (sixteenth century) created a more Sp style parallel with the trend in architecture. Montañés and Alonso Cano were sculptors of religious images, mainly in wood and their work (seventeenth century) is noteworthy. During the seventeenth century the It-

alians exercised great influence on sculpture in Spain and in the nineteenth José Álvarez, with his neo-classic style, may be compared to Canova. Other sculptors of note during the period are Antonio Sola, Mariano Benlliure, Augustín Querol, Susillo and Blay. Twentieth century sculpture has produced nothing of great importance though mention should be made of the work of Mateo Inurria and Victor Macho.

Painting.—The sources of painting in Spain are to be traced in illuminated MSS and in the remains of mural decoration. The interesting murals of the San Quiré Church in Poblet (fifth to tenth centuries) those in the little church of El Cristo de la Luz in Folco and the scenes from the Passion in St Catherine's Chapel in San Isidoro in Leon (both twelfth century) are together with a number of remarkable altar pieces (*retablos*), the earliest examples of Sp painting. In the twelfth century Antón de Segovia is the first Sp painter of note, and in Catalonia Luis Dalmau (with his 'Virgen de los Concelles' fourteenth century) an imitator of Van Eyck may also be mentioned. By the fifteenth century a really national type of painting has emerged though in the sixteenth century the so-called mannerists show evidence of It influence in motive and method. The great age of Sp painting starts with what has been called the Seville school in the fifteenth century. Painters of the period are Fernand/Tabla ('Jesús en el Cimiento') and 'Matanza de Inocentes') Juan H. spalenzo (a tiny tch and 'Ángeles y Pedro y San Pablo') Juan Nuñez ('Piedad' in Seville Cathedral) Juan de Juanes and Luis de Vargas. Neither Charles I nor Philip II paid much attention to Sp paintings, influenced as they were by Dutch and It masters (as may be seen in the Prado collections) but following the transition period the leading names in the history of Sp painting are those of Domenico Theotocopuli called El Greco (1548-1614) an artist of mystic inspiration ('Expolio and Entierro del Conde de Orgaz' are two magnificent examples of his art), José Ribera (1581-1656) nicknamed El Españoleto, Francisco Zurbarán (1598-1664) and El Divino Morales (examples of his art 'Ecce Homo' and 'Virgin carrying the Infant' both in the Prado are remarkable for their ultra refinement). Of somewhat later date are Alonso (1601-67) Juan de Valdes Leal Cerrano (noted for his portraits of the royal family) and Claudio Coello (1630-93). But the greatest names are those of Velázquez and Murillo both born in Seville. Velázquez is one of the great names in painting generally and he is famous as a prophet of modern impressionism while the continued popularity of Murillo in spite of the depreciation of some artists, has been well surmised to rest on the spirit of youth which breathes from his work. Murillo was a great illustrator and what he did for the simple religious folk of Seville is akin to the work of Raphael for the humanistic needs of

Rome With the advent of the Bourbons in the eighteenth century foreign influence again made itself felt, but Sp individualism asserts itself once more in the work of Lucas Jordan and in the nineteenth century, in that of Goya especially in portrait painting. Following Goya who reveals to some extent the influence of Tiepolo come L-quival (1806-57) and López (1772-1830) both of whom may be said to prepare the way for the typically Sp Zuloaga, who in the grotesque has affinities with Goya but follows Velázquez in accent. Of more recent times are José and Federico Madrazo, Rosales, Fortuny, Casado del Alisal, and Moreno Carbonero. Of present times are Zuloaga (b 1870), Mir, Anlada, Chicharro, Sorolla (1863-1923), a realist who revels in sunlight. Solana whose Village (carnival) recalls the work of El Greco. Rodríguez Acosta, Romero de Torres, and Ramiro Arruc, notable for his bright scenes of Basque life. Mention must also be made of Sp painters abroad, particularly Pablo Picasso (b in Málaga) an artist of great versatility and Salvador Dalí a Catalan surrealist who has designed for the stage.

See C. G. Hartley, *A Record of Spanish Painting 1904*, A. F. Calvert, *Sculpture in Spain 1912*, R. A. Tatlock (ed.) *Spanish Art 1927*, C. R. Post, *Spanish Painting 1930-35*, B. Bovan, *A History of Spanish Architecture 1938* and P. Hendy *Spanish Painting 1946*.

Spanish Broom, or *Spartium junceum* is the single species of its genus, which belongs to the Leguminosae. It flourishes round the Mediterranean, greatly resembles the common broom and its flowers give a yellow dye.

Spanish Fly, see CAN THARIDAE.

Spanish Guinea, or Muni River Settlements, Sp protectorate of W Africa comprising a continental area and an is. the prin being Fernando Po. On the coast of the former are Sp, Ger and Eng trading posts, but the interior is occupied only by the native inhab. It has enormous forest growth but there are also cocoa and coffee plantations and palm oil rubber ground nuts and copra are produced. The cap is Santa Isabel on Fernando Po Is. Continental Guinea has an area of 10 040 sq m, and a pop of 138 800 (960 whites) Bata is the chief tn. There is live manica of 813 sq m and a pop of 28 700 (1600 whites).

Spanish Main, name formerly applied to the Caribbean Sea and to the N coast of S America from the Orinoco to Darien also to the shores of the Sp possessions in Central America.

Spanish Morocco, see under MOROCCO *Spheres of Influence and Government*.

Spanish Moss, see TILIANDRACEAE.

Spanish Reformed Church, small body of Protestants founded in Seville in 1871 by the ex Rom Catholic priest Palomares. In 1878 they petitioned the Lambeth Conference for a bishop and this led in 1894 to the consecration of Bishop Cabrera. Their prayer book is founded on the Anglican Book of Common Prayer but contains also materials taken from the old Mozarabic Rite. They have about a dozen congregations.

Spanish Succession, War of, see under SPAIN, *History*.

Spanish Town, tn of Jamaica. Brit W Indies, stands on the Cobre R 15 m N W of Kingston. Founded as Santiago de la Vega in 1529 it was the cap of Jamaica until 1871. It is a railway junction. Pop 12 000.

Spar, term applied to the crystalline non metallic minerals $crystal$ $calc$ $fluor$ $calc$ (crystalline calcite) $fluor$ $calc$ (crystalline fluoride of calcium).

Sparking Plug, see under MOTOR CARS *Ignition*.

Sparrow, name given loosely to many small birds of various families but applied particularly to the different members of the genus *Passer* in the family *tingillidae*. They are natives of almost all parts of the Old World but not of Australasia and were introduced into America where and in Sp in they are troublesome because of their liking for seeds and grain crops. The common Brit S known usually as the house S is *P. domesticus* and this species occurs also in N Africa and Europe. It is a strongly built bird, with only a chirp as its highest vocal effort and in diet it is omnivorous feeding on insects and their larvae in spring and summer and on grain in winter. *P. montanus* the tree S the only other Brit species is a smaller bird found on the W coast of Scotland and in England. The hedge S or *Acrocephalus modularis* is a species of lurdide and is related to the nightingales and thrushes.

Sparrow-hawk, term applied in Britain to *Accipiter nisus* in America to several other species of the family *Accipitridae* but especially to *Amnunculus sparverius*. The former occurs in Europe N Asia and N Africa and is a bluish grey bird with brown and white markings, the latter is of a rufous colour with black and slate grey markings. Both are handsome birds of active habits and the Brit S was formerly used in falconry. Mice, insects and even snakes form the food of *A. nisus* but *A. nisus* prefers birds and mice.

Sparrow, Java, see KITE BIRD.

Sparta, city and city state of ancient Greece nowadays the cap of the Grk prov Laconia. It was also called Lacedaemon traditionally after the founder Lacedaemon the son of Zeus and Laya. The city was situated on the river Eurotas standing in a plain containing some few hills and bounded by the R Eurotas Q nus and Mt Taygetus on the W the distance from the sea was about 20 m thus the situation was secure against foes, and well chosen for the building of a city. According to tradition Menelaus the brother of Agamemnon was king of Sp. Therapne was probably his cap supposed to be the burial place of both Helen and Menelaus, it lies a few miles South of Sp. According to some scholars the Dorian invasion took place after the Trojan war Sp became the Dorian cap of Laconia ruled by the two sons of Aristodemus, the Achaean inhab being reduced to a state of slavery. Herodotus tells us of the two kings always reigning together pre-

sumably a continuation of the rule of the twin sons of Aristodemus. Internal troubles distracted the city until the election of Lycurgus, who, according to tradition, arranged a new constitution and founded the real greatness of S. In the second half of the eighth century B.C. the first Messenian war took place, and the second after 650 and the whole of Laconia was subdued by S. About 550 the Spartans were masters of the greater part of the Peloponnese. Cleomenes I (q.v.) raised S. above her rivals; he died about 486. He proclaimed himself an Achaean and not a Dorian by birth, according to Herodotus. The Spartans refused to join with Alexander the Great in the Asiatic expedition and from about that date their power slowly declined. It was not possible they could hold all they had won by force in past years; their system of legislation could not live. Cleomenes III (q.v.) (225) endeavoured to restore the constitution of Lycurgus but was defeated by the Achaeans and fled to Egypt. S. fell with all Greece under the rule of Rome. What we know of the internal government of S. is exceedingly interesting—the words 'Spartan mother' which have been used so long for severely healthy minded mothers rightly claim their origin from the system that S. used for the selection of its fittest offspring. The Spartans were only conquerors and military rulers; they were never leaders of culture or commerce. Archaeologists have worked hard on Laconia since 1905 the Brit. School at Athens has brought to light many valuable and interesting relics of antiquity, which are preserved in the archaeological museum of the agora. See also GRIFFITH, *History*, PELOPONNESIAN WAR. See the *British School Annual* vol. xii (1905-6) onwards. *Excavations at Sparta*. L. Parrot, *Storia di Sparta antica* 1917 and F. Ollier, *Le Mitage spartiate* 1933.

Spartacists (*Spartakusbund*), radical Marxist group founded in Germany in 1917 by Karl Liebknecht (q.v.) and Rosa Luxemburg (q.v.), both of whom met their death after an attempted rising in 1919. The German Communist party developed out of the S.

Spartacus, leader in the third Servile war against Rome (73-71 B.C.) was a Thracian by birth, taken prisoner on one of his bandit raids; he was trained for a gladiator and in 73 B.C. urged his fellow slaves to revolt. He took up his position on Vesuvius, and having collected about 70,000 men for two years he defeated army after army of Roman soldiers until he was himself at length overcome by CASSIUS on the R. Silarus (72 B.C.). S. was slain, and the insurgents who escaped were ultimately defeated by Pompey.

Spartanburg, cap. of the Co. of the same name S. Carolina 93 m. N.W. of Columbia. Its chief buildings are Wofford Methodist College, Converse College, and a state school for the blind, deaf, and dumb.

Industries include cotton and iron manufs. and lumber milling. Pop. 32,000.

Spasm, sudden contraction of muscles. The contraction is quite involuntary,

though it may be initiated by some voluntary movement. The cause is some affection of the nerves or of the central nervous system, and S. occur in many diseases which involve inflammation of nervous tissues. There are two varieties of S., *tonic* and *clonic*. In *tonic* S. the contraction is sudden and persists without relaxation for some time when the relaxation may take place suddenly or gradually. In *clonic* S. the contraction and relaxation succeed each other regularly. The most severe form of *tonic* S. is that induced by the action of the *Bacillus* (*Clostridium*) *tetani* (lock jaw). This bacillus acts free a toxin in the blood which has a marked effect on the spinal cord. The muscles of the face and neck become contracted so that the jaw becomes firmly fixed in the shut position. There is difficulty in swallowing. The muscles of the throat, abdominal limbs, and chest are also affected and the patient is bound so firmly by the muscular bands that he may be unable to breathe or may expire from exhaustion. Poisoning by strychnine also provides an example of sudden and violent S. owing to the action of the drug on the central nervous system. Defects of digestion may have a poisonous effect on the nerves, leading to convulsions in the young and occasionally to epileptic form attacks in adults. *Tetani* and *spasm* is a term applied to conditions such as winter cramp in which one voluntary action voluntarily performed may bring on a tonic S. This also is of central nervous origin. S. in the limb muscles is 'cramp', in the intestine it is called 'colic'. S. of the bronchial tubes occurs in asthma.

Spathio Iron Ore, see under IRON AND STEEL SMELTING.

Spa Treatment, see under BALNEOLOGY AND BATHOTHERAPEUTICS.

Spavin, see HORSE (DISEASES).

Spawn, term commonly used of the extruded egg masses of such oviparous animals as fish, amphibians and molluscs. It is produced in very variable quantities (e.g. the ling lays about 150,000,000 eggs, and the Amer. oyster 60,000,000 eggs) and is much preyed upon even as in the case of the stickleback by the female herself, but a variety of means has been devised for its protection. The name is also given to the mycelium of mushrooms and other fungi, seen as white threads in decaying matter though it is a misleading term in this connection since the mycelium is a purely vegetative portion of the fungus.

Speaker of the House of Commons, see under PARLIAMENT.

'Speaker, The,' see under NEW STATSMAN AND NATION.

Spear, weapon used by hunters and warriors of many races and ages. The original S. was a wooden stake with a sharpened end as man learnt the use of metals, bronze heads were fitted to wooden shafts and as casting became more expert, the S. by the end of the Bronze Age had reached a high state of perfection. It was one of the most important weapons of prehistoric and early historic communities, and, with an iron

head, is found 'widely distributed. In contrast to the sword, it was in early times the poor man's weapon. Thus the lance and the bayonet are but descendants of an original wooden stake. The Romans used a short, heavy S. called a pilum, which was a missile weapon or javelin to be thrown at the enemy, not thrust. The lance or S. used in the tournaments of the Middle Ages was of fine steel, often beautifully inlaid and decorated with a pennon. The shape of the blades of the weapon varied according to the country and to the desire of the owner; thus sev. patterns of the same time and country may be preserved. See G. F. Laking, *European Arms and Armour*, 1920.

Spearmint, see MINT.

Special Air Service Regiments, the S. A. S. Regiment was formed by Capt. (later Lt.-Col.) David Stirling in the summer of 1941 in the Middle E. to harass the enemy airfields and lines of communication. The original plan was to reach the target area by parachute and to escape either by sea or to link up with the Long-range Desert Group (g.v.) and return to base overland.

After the virtual failure—due to bad weather and heavy casualties in landing—of the first operation against Trimi airfield in Nov. 1941, it was decided that motorizing all the way to the target and back would be safer and more reliable than parachuting, and that whilst every man would still need to be parachute-trained, that should no longer be regarded as the prin. means of reaching the targets. Success rapidly followed success, particularly against airfields, and many carefully timed and co-ordinated attacks were made against airfields not only in the desert, but also in Crete and Rhodes, with the object of destroying or grounding as many aircraft as possible during the difficult and hazardous passage of convoys to Malta. The numerous raids against targets in Crete and Rhodes were carried out by the special boat section, who had been attached to the S. A. S. Regiment almost from the start. This unit, although also parachute-trained, was highly skilled in operating from submarines, motor torpedo boats, and schooners manned by both Brit. and Gk. crews.

On the conclusion of the desert campaign the S. A. S. Regiment was reorganised into two squadrons, one of them being concerned primarily with small-scale seaborne raids and being designated the Special Boat Squadron. This squadron operated in the Aegean and Dodecanese Is. until they moved to Italy in Aug. 1944. Based there, they formed into a regiment and operated until the end of the war in Italy itself, Albania, Yugoslavia, and Greece—in the last named, leading the pursuit of the Ger. forces in their withdrawal in the autumn of 1944.

In the summer of 1943 the special raiding squadron of the regiment, with one section of the special boat squadron, took part in the invasion of Sicily, followed on to Italy and returned to the United Kingdom to reform on a regimental

basis at the end of 1943 as the 1st S. A. S. Regiment. Parties were parachuted into France just prior to D-Day in June 1944, not only to conduct their own operations but also to assist Fr. resistance fighters. The 2nd S. A. S. Regiment had been formed in the United Kingdom in the summer of 1943; after service with the First Army in N. Africa and the Eighth Army in Italy, this regiment, together with the 1st S. A. S. and two Fr. units and one Belgian under the command of H.Q. S. A. S. troops, was employed in the course of the campaign in Europe. The majority were parachuted in with their jeeps, but some were infiltrated by road between the opposing armies. These parties often spent as long as three months harassing the enemy, receiving orders from London and being resupplied by air. Apart from the great material damage caused by these parties they tied down large numbers of Ger. troops to defensive roles and search parties when they would normally have been actively engaged at the front. At the conclusion of the European campaign both S. A. S. R. were sent to Norway to assist in rounding up Ger. troops. They returned to the United Kingdom for disbandment in the late summer of 1945.

There is at present (1950) a Territorial S. A. S. Regiment designated 21st S. A. S. Regiment (Artists) T. A. which has a number of wartime S. A. S. personnel still serving.

Special Constabulary, see under POLICE.

Special Licence, see FEES, *Clerical Fees*.

Special Pleaders, members of an Inn of Court who devote themselves mainly to the drawing of pleadings and to attending at judges' chambers. If not called to the Bar, as was in former times frequently the case when many S. P. practised as such prior to being called to the Bar, they took out ann. certificates from the Board of Inland Revenue on which a duty was payable.

Special Service Troops, name applied in the Second World War to commando (g.v.) forces.

Specialty Debt, one that is evidenced by deed (g.v.), or instrument under seal. Such a debt is called a debt by *specialty* in order to distinguish it from a *simple contract* debt (see also CONTRACTS, DEBTS). S. Ds. enjoy priority in the order of payment of debts out of the assets of a solvent or insolvent estate over all simple contract debts.

Species, chiefly used as a term in natural hist. In the attempt to study life in its infinite variety, grouping according to similarity is a necessary scientific process, and a first div. gives the phylum, consisting of sev. classes; the class is subdivided into orders; an order contains groups, each of which is a family; this again is grouped into genera, each genus into S., while a S. is grouped into varieties. The primary grouping is necessarily by means of very fundamental differences, but they become progressively less fundamental and perhaps more complex and difficult of discrimination. The theory of evolution and

the great impetus it gave to the study not of mere apparent differences but differences of development from the germ, has made classification more certainly determinable and shown what essentials distinguish between groups. Thus the distinguishing features of a *S* are not merely observed in the individuals but in generation after generation of them. Thus inbred acquired characteristics due to environment are insufficient grounds for distinction of *S*, though the transmission of such a much disputed point might if it took place and persisted give rise to new *S*. This persistence of the distinguishing features is very difficult to determine in extinct *S* when fossils are not numerous and leads to difficulties in classification. At present the classification generally is one largely of convenience and consensus of opinion in deciding what differentia are to be selected. It has been common and is still to consider different *S* determinable by infertility the one with the other although hybrids are becoming more and more common with increased knowledge such hybrids are however usually sterile the classical example being the mule. The white, black, and yellow races of man kind have many differentia yet are considered varieties of one *S*. One method of convenience is to arrange a genus according to certain characteristics simply statistically and consider the best marked groups as *S* there are in any case examples difficult to group falling as it were equidistant between groups. From the point of view of evolution it seems probable that *S* have largely arisen from infertility but chiefly because persistence from generation to generation is so often chosen as a reason for deciding the characteristic. If the offspring of any parentage is examined and variations are observed and experience in estimating the degree of such family variation is useful in deciding whether characteristics are sufficiently marked to warrant grouping in *S*. The differences between *S* should always be greater than those found in offspring from the same parentage. In spite of all guides the greatest students are often in disagreement as to the number of *S* in a genus for example different authorities state the number of *S* of birds found in Germany at such different figures as 367, 319, 406, 900. Such genera as *Rubus* and *Rosa* show the difficulty of deciding what shall constitute a *S*. Some biologists (the 'splitters') favour the establishment of many *S* in a certain genus whilst others (the 'lumpers') are satisfied with a division into a few *S* only. The question of the origin of *S* occupied the attention of naturalists very largely during the early part of the nineteenth century and culminated in Darwin's theory of natural selection and survival of the fittest. Of very great moment is the question of transmission of acquired characteristics on which authorities are yet in disagreement. Each *S* has its own characteristic number of chromosomes (*n*) which is for instance forty-eight in man and twenty-four in the grass frog *Rana temporaria*. It is thus possible to distinguish *S* on this basis.

Specific Gravity, of a substance is the ratio of the weight of any volume of that substance to the weight of an equal volume of a standard substance. The standard substance usually adopted is water at a temp. of 4°C or 39°F. The standard substance is sometimes varied in the comparison of some gases. The weight of unit volume of the standard substance is denoted by w . Now if W is the weight of a body V its volume and S its *S.G.*, then the weight of V units of volume of water = Vw but the weight of volume V of the substance is S times as great therefore $W = VSw$. The *S.G.* of a mixture, having given the volumes of its components as V_1, V_2, V_3 and their *S.G.* as S_1, S_2, S_3 may be determined by the use of the above formula. Suppose a contraction takes place in the total volume due to the mixture e.g. mixture of alcohol and water, and let V and S be the *S.G.* of the mixture, then $V = k(V_1 + V_2 + V_3)$ where k is some fraction. The weights of the components are respectively $W_1, V_1S_1, W_2, V_2S_2, W_3, V_3S_3$ and the total weight of the mixture $W = W_1 + W_2 + W_3$, but $V = V_1 + V_2 + V_3$

$$VSw = (V_1S_1 + V_2S_2 + V_3S_3) \\ S = \frac{V_1S_1 + V_2S_2 + V_3S_3}{V_1 + V_2 + V_3}$$

If there is no contraction then $k = 1$. In the centimetre gramme second system of units w is the weight of 1 c.c. of water and thus density and *S.G.* are the same numerically. Hence if a body is capable of being measured and weighed the *S.G.* may be found directly. One of the most useful vessels for determining *S.G.* is the *S.G.* bottle. It may be used for finding the *S.G.* of either solids or liquids. It consists of a glass flask having a tightly fitting stopper through which a very fine hole is bored. The bottle is completely filled with liquid and the stopper pushed in the superfluous liquid flows out through the hole in the stopper and may be wiped off so that the bottle filled in this way always contains the same volume of liquid. A counterpoise is provided in order to obviate the necessity of weighing the bottle at each observation. To find the *S.G.* of any liquid the bottle is filled with water and the weight of the water W_1 is found. It is then emptied and filled with the liquid whose *S.G.* is required and the weight of this equal volume of liquid W_2 is found. Then from the definition the

S.G. of the liquid is $\frac{W_2}{W_1}$. To find the *S.G.* of a solid insoluble in water by the *S.G.* bottle the solid is first weighed W_1 . The *S.G.* bottle is then filled with water, and the weight of the water contained and the solid is obtained W_2 . The solid is then placed in the bottle and a quantity of water will overflow equal in volume to that of the immersed solid. The bottle containing the water and the solid is then weighed and then clearly their combined weight (W_2) will be less than W_2 by the weight of the displaced water. Hence the weight of an equal volume of water

is $W_1 - W_2$, and the S. G. of the solid is $\frac{W_1}{W_1 - W_2}$. A most important principle in this connection is that due to Archimedes. The principle states that a solid immersed in a fluid loses as much of its weight as is equal to the weight of fluid it displaces. Thus to find the S. G. of a solid insoluble in water and heavier than water it will only be necessary to weigh the body first in air and then in water. The first part consists of ordinary weighing, but in the second part the body is attached to the scale pan of the balance by a very fine thread which suspends the body in water. If W_1 is the weight of the solid in air, and W_2 in water, then by Archimedes' principle the weight of an equal volume of water is $W_1 - W_2$,

and hence the S. G. of the solid is $\frac{W_1}{W_1 - W_2}$.

If the solid is lighter than water it would float when suspended in the water, and thus a heavy piece of metal is attached to keep the body under water. This piece of metal is called a *sinker*. The procedure is then as follows. Weigh the solid in air, W_1 , suspend the solid and sinker as above in water and take their weight, W_2 , suspend the sinker alone in water and weigh, W_3 . The weight of the body alone in water is $W_1 - W_2$, hence loss of weight in water is $W_1 - (W_2 - W_3)$, i.e. $W_1 + W_3 - W_2$,

hence S. G. of the body is $\frac{W_1}{W_1 + W_3 - W_2}$.

If the S. G. of a liquid is required, any solid is taken and weighed in air, W_1 . It is then suspended in water and weighed, W_2 . Hence weight of water displaced is $W_1 - W_2$. It is then suspended in the liquid and weighed, W_3 . The weight of liquid displaced is $W_1 - W_3$. Since the volumes of water and liquid displaced in each case are the same, the S. G. of the liquid is $\frac{W_1 - W_2}{W_1 - W_3}$. In the case where the solid is

soluble in water its S. G. may be found by utilizing some liquid in which it is not soluble, the S. G. of which is known. The solid is weighed in air and in the liquid, the weight of the volume of liquid displaced being thus found. Dividing this weight by the S. G. of the liquid, the weight of an equal volume of water is obtained, and hence the S. G. of the solid. An important set of instruments which depend on Archimedes' principles are the hydrometers. These instruments are used commercially for obtaining the S. G. of liquids, the S. G. giving a rough test of the purity or degree of concentration of the liquid. For theoretical purposes the one generally used is Nicholson's hydrometer, by which the S. G. of a liquid or a solid may be found. Commercially some form of the common hydrometer is used. It consists of a long glass tube blown out into two bulbs at its lower end and closed at its upper end. The stem and the upper bulb are filled with air and the lower bulb with mercury, so that when the hydrometer is in the liquid it floats upright, both bulbs and part of the stem being immersed. The stem is graduated, and the height to which the liquid

risks on the stem is thus indicated and serves to determine the S. G. of the liquid. The stem is generally divided into a number of equal parts. In Beaumé's hydrometer for fluids lighter than water the stem is graduated from 10 to 70, the hydrometer reading 10 when plunged in water. Another hydrometer is used for liquids heavier than water. Twaddell's hydrometers for fluids heavier than water consist of a set of six. The first reads from 0 to 24, reading 0 when placed in water. The next hydrometer sinks to the highest mark on the stem in a liquid in which the first hydrometer indicates the lowest mark, and so on for the others, each hydrometer being used for rather heavier liquids. The inventor also gives his name to a hydrometric scale, on which 200° indicate a unit of S. G. The *lactometer* is a common hydrometer for testing milk. The highest and lowest points indicate pure water and pure milk, the intermediate points giving the proportions of milk and water in a mixture.

Specific Heat. When a hot body is placed in contact with a cold body, the temp. of the hot body falls, while that of the cold body rises. To explain this, it is assumed that something which we term *heat* passes from the hot to the cold body. The unit quantity of heat is called a calorie, and is the amount of heat absorbed by 1 gram of water when its temp. is raised through 1° C. The S. H. of any substance is the quantity of heat, measured in calories, which will raise the temp. of the substance through 1° C. The S. H. of a solid is determined by the *method of mixtures*. The heated solid is immersed in a quantity of water and the resulting temp. is noted. Thus the solid is first heated by immersing in a beaker containing hot water which is allowed to boil for some minutes until the solid takes the temp. of the water. A known weight of water (w_2) is placed in a copper vessel, called a calorimeter, and its temp. is noted, say t_2 . Into this water the solid, which is at a temp. 100° C., is placed, the whole is shaken up and the resulting temp. (t_1) noted. If w_1 is the weight of the solid, s_1 its S. H., then the amount of heat given out by the body in falling from 100° to t_1 is $w_1 s_1 (100 - t_1)$. The amount of heat absorbed by the water is $w_2 (t_1 - t_2)$, the S. H. of water being taken as unity. Hence $w_1 s_1 (100 - t_1) = w_2 (t_1 - t_2)$; and from this equation the unknown S. H. (s_1) can be found. The result here obtained will not be strictly accurate, as various sources of error in the experiment have been ignored. For instance, the temp. of the boiling water may not have been 100° C.; a certain amount of heat will be lost by the body in transferring from the boiling water to that in the calorimeter; also no allowance has been made for the heat absorbed in raising the temp. of the calorimeter and thermometer. To eliminate these and other sources of error somewhat more elaborate experiments are required. The S. H. of a liquid may be measured in a similar way with the aid of a solid of known S. H. Other methods for solids and liquids involve the measure-

nient of the rise of temp produced in them when a known amount of heat is added to them by an electric current. In the case of gases the determination is more difficult. Each gas possesses two S Hs, one at constant pressure and the other at constant volume. The apparatus required is described in any textbook on heat. The S H of a body is by no means a constant quantity, but varies with the state of the substance, the presence of impurities and with the temp. Thus the S H of ice at 0°C is equal to 504 whereas that of water at 0°C is 1. Again the S H of water varies from 1 at 0°C to 1.03 at 100°C. Dulong and Petit discovered the remarkable law that the product of the S H by the atomic weight is the same for all elementary substances. This law is however only approximately true for elements at ordinary temps. in the solid state. This product is termed the atomic heat and its average value is about 3. Horton, silicon and carbon possess very low atomic heats at low temps. but ordinary atomic heats at high temps. The law of S H developed by Debye and others explain not only why atomic heats have their usual observed values but also why atomic heats fall at low temps.

Specific Performance. A device of S P is in equity for the breach of certain kinds of contracts and in contrast to the traditional common law remedy of an action for damages, orders the defendant to carry out his part of an executory (q1) contract precisely according to its terms. Such devices commonly, though not exclusively, relate to contracts for the sale and purchase of *lands* and *leases*. Contracts to sell specific goods may be ordered to be specifically performed in exceptional cases where damages would be inadequate as for example in the case of a contract to sell a rare book or picture or an heirloom but not where things equally good are readily obtainable. All actions for S P of contracts relating to land are heard in the chancery division of the high court but in actions for breach of contract to deliver specific goods S P may be decreed by any division of the high court. The jurisdiction is purely discretionary and the court will not decree S P where it would be unreasonable to compel the defendant specifically to perform his contract.

Spectacles, device consisting of glass or plastic lenses mounted in frames (or lensless mountings) so as to be held before the eyes in cases of defective vision. Roger Bacon was the first to allude to glass lenses in 1268, though it seems little doubt however that the Chinese employed lenses ground from quartz or semi precious stones from early times. Marco Polo records that when he first visited China in 1270 he found the people using lenses of this kind to aid their sight.

These aids to vision are now extensively used. Convex lenses are used to correct hypermetropia (long sight) concave lenses for myopia (short sight) cylindrical lenses for astigmatism, in cases of presbyopia (old sight) convex lenses are added to the distance correction to correct the loss of accommodation (ability to focus near

objects) and prismatic lenses to correct muscular imbalance. Glass used in lenses must be colourless and without surface flaws striation or small bubbles which would all interfere with the production of a clear undistorted retinal image. Crown glass is usually used for spectacle lenses ($n = 1.52$). Tinted lenses may be used to protect over sensitive eyes from glare (normal eyes from excessive glare). Bifocal or trifocal lenses are specially ground lenses to give presbyopic patients the combined effect of distance lenses and that for nearer range(s) in one pair of S. Plastic lenses are now manufactured in both bifocal and single sighted prescriptions and are unspinterable and much lighter in weight than glass lenses. The surfaces however are not so hard as glass and are therefore more easily scratched. All modern spectacle lenses are made in the form (Widfield) form. The frame of the S should fit comfortably and it is essential that the S should bring the centre of the lens opposite the centre of the pupil of the eye in front of which it is placed. Contact lenses made from blown glass or plastic and worn in direct contact with the eye under the eyelids are being used to correct defects for which no S can be designed and also they have aesthetic advantages over S for people in certain professions. This modern development is still in its infancy.

'Spectator, The' a sixpenny weekly English periodical established in 1828. The founder and first editor proprietor Robert Stephen Rintoul (d. 1858) took the title and possibly the ideal of a non political family journal from the original S planned by Addison (q1) and Steele (q1) which came to an end in Dec. 1712. Although non political in intention the S declared its faith in 1832 by taking a strong stand in favour of the Reform Bill and its influence independent of party was used to support the trades union movement and also to further the colonial schemes of Gibbon Wakefield (q1). Later in the century the S was remarkable for its unpopular but right minded advocacy of the North in the American civil war while Walter Bagehot friend of Hutton and Carlyle were among many distinguished contributors. Since its foundation except for one brief interlude four men have guided the S for the past century. Rintoul Hutton (q1) and Meredith Townsend (q1) and John St. John Strachey (q1). Sir Evelyn Wrench (q1) succeeded in 1925 as editor and chief proprietor. In 1932 Wilson Harris (from 1941) to 1950 Independent M.P. for Cambridge Univ.) became editor. Sir Evelyn Wrench remaining chairman of the board of directors. The S continues to day to supply on a completely non party basis authoritative comments both critical and explanatory, on events of public interest at home and abroad emphasising particularly the importance of close understanding between the members of the British Commonwealth, the Commonwealth, and the U.S. members of the United Nations. See W. B. Thomas, *The Story of the Spectator*, 1928.

Spectre of the Baeken, see BROCKEN

Spectres, see APPARITION

Spectrographic Analysis, see under SPECTRUM AND SPECTROSCOPY

Spectroheliograph, special photographic spectro-scope suggested by Jansen in 1870 applied by Hale and Deslandres about 1890. A second slit, parallel to the collimator slit is placed close in front of the sensitive plate the photographic plate is moved in correspondence with the sun's movement across the collimator slit with the result that a photograph is produced by light of only the single wave length isolated by the second slit. By its means the spectrum of any vapour in the sun may be studied in isolation.

Spectrohelioscope, instrument made on essentially the same principles as the spectroheliograph but in which by means of a rapidly rotating rectangular prism a finite portion of the solar atmosphere is rendered visible to the eye in the light of a single wavelength.

Spectroscopic Binaries are those very close binaries (double star)—less than one twentieth of a second of arc apart—which cannot be resolved with the most powerful telescope. The spectro-scope is used to reveal their orbital revolution and the principle utilised by the astronomer known as the Doppler (g) effect supplies much valuable information about these systems. It is not quite correct to say that one body revolves around another though the statement approximates closer to the truth the more massive one body is in comparison with the other as in the case of the sun and the earth. Actually each body revolves around the centre of gravity of the system and hence if the orbital plane of the binary system lies in any direction except in a plane at right angles to the line drawn from the earth to the orbital plane each star will alternately approach and recede from us. In the exceptional case mentioned neither star will approach nor recede from the earth and the Doppler principle is inapplicable. If the spectrum of two stars apparently very close together is examined the stars being nearly in the line of sight but not physically connected and therefore relatively at rest each to the other the spectrum looks like that of a single star. But if the two stars form a binary system each must be moving round their common centre of gravity and the lines of the spectrum of the approaching one will be shifted towards the violet end and those of the receding one towards the red end. Corresponding lines will thus be separated and from the shift of a line the velocity of each component can be deduced. Suppose the wave length of some particular line is 4000\AA (\AA is an Angstrom unit) and the shift is 1\AA , the velocity of approach or recession according to the end of the spectrum towards which the line is displaced, is $\frac{1}{4000}$ the velocity of light, that is, over 40 m/sec . It has been found that Capella, a well known spectroscopic binary, gives a spectrum of double lines which change from double to single and then from single to double, each in fifty-two days, which tells us that each

star revolves round its centre of gravity in 104 days. When one star is much brighter than the other as happens in most cases, only the spectrum of the brighter one is visible and thus severely restricts the amount of information that can be derived. If both spectra are seen and the shift of one is a certain fraction of that of the other it is certain that the same fraction represents the ratio of the velocities of the components and hence the ratio of the masses and also of their distances from their centre of gravity. Knowing the distance of the stars from the earth from their parallax (q) and their angular separation from the use of the interferometer their actual linear distance apart is easily deduced. From this and their period their combined mass is found from the formula $M = \frac{4\pi^2}{L^3} I^2$ where a is their distance apart in astronomical units, T their period in years and M their mass in terms of the sun is the unit. Knowing the ratio of their masses the mass of each component can then be deduced. It has been found that the periods of S. B. range from a few hours to a few years and that in more than half the cases they are less than ten days.

Spectrum and Spectroscopy When a beam of light is passed through a prism diffraction grating or other dispersing agency it is generally spread out in a fan wise beam which if made to fall on a white screen produces a coloured band of light known as a spectrum. Study of spectra began when Newton bought a glass prism at Stourbridge 14 or near Cambridge and performed the celebrated series of experiments, that he has described in his *Opticks*. Newton's description of his first experiment runs as follows. In a very dark chamber at a round hole about one third part of an inch broad made in the shutter of a window I placed a Glass Prism whereby the beam of the Sun's Light which came in at that hole might be refracted upwards towards the opposite Wall of the chamber and there form a coloured Image of the Sun.

Fig 1 is Newton's diagram explaining the arrangement. Newton observed that the patch of coloured light VR thrown on the paper consisted of the following colours violet indigo blue green yellow orange red arranged in that order. The spectrum produced in this way was not

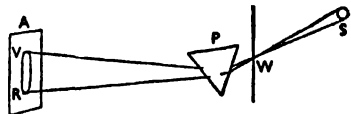


FIG 1.

pure, i.e. the colours overlapped to a considerable extent but the essential features of the production of the spectrum in this manner were explained correctly by Newton as follows. The white light from the sun is refracted when it enters the prism and again when it leaves it. Now this white light consists of a mixture of the above colours, and the prism splits up the

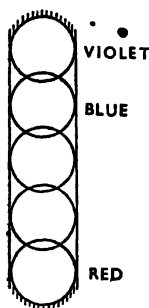


FIG. 2

means of avoiding the serious overlapping in the first experiment. Newton's final arrangement is essentially that of the

white light into its component colours. Violet light is deviated more than the blue light, and red light is deviated least of all. Fig. 2 represents Newton's explanation of the coloured patch formed on the wall. He found that it really consisted of an infinite number of coloured images of the hole in the shutter overlapping one another, some of these are shown in the figure. Their colours range between violet and red. In order to improve the points of the spectrum it was necessary to devise some

gent beam is parallel, and is brought to a focus at F by the lens M. Thus the observer views both crosswires and coloured image of the slit by means of the eyepiece E. Each coloured component of the original light is brought to a focus on the crosswires, and overlapping is minimised in this way and the spectrum is "pure." Overlapping cannot be entirely avoided, since the slit though narrow has a definite width and, as stated above, the arrangement forms coloured images of this slit at F.

Types of Spectra—The solar spectrum as viewed by Newton was a continuous band of colour stretching from red to violet. Fraunhofer, however, discovered that it was crossed by numerous dark lines, indicating that certain colours were missing from the complete spectrum. The explanation of these lines is given later. An incandescent body gives rise to a continuous spectrum; the band of colours is continuous. The spectrum of an

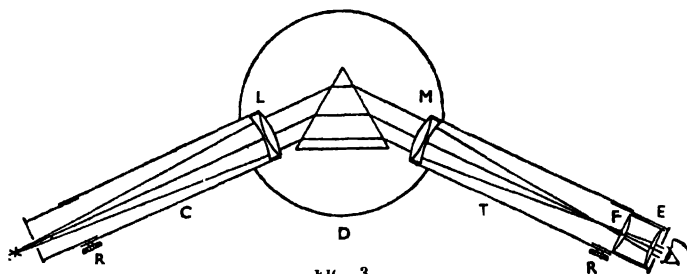


FIG. 3

ordinary pattern of the modern spectro-scope.

The Spectroscope—Fig. 3 shows the essential features of the ordinary spectro-scope. C is the collimator, and consists of a hollow tube blackened on the inside and containing an achromatic convex lens L at one end and a narrow slit at the other. R is a rack and pinion arrangement for moving the slit relative to the lens L. T is the telescope, with the eyepiece E mounted at one end and an achromatic convex lens M at the other end. The rack R enables the eyepiece (and crosswires at F) to be shifted relative to the lens M. The prism is mounted on a prism table P that carries a circular scale divided into degrees and half-degrees. The collimator is fixed, but the telescope carries a vernier moving over the scale of the prism table, and the position of the telescope can be read to $\frac{1}{2}$ or $\frac{1}{4}$ of a degree.

The instrument is adjusted so that the slit is at a principal focus of the collimator lens L, the crosswires F at a principal focus of the telescope lens M, and finally so that the eyepiece is focused on the crosswires at F.

Light from the source then enters the slit and is refracted at L so that a parallel beam of light falls on the prism. The diagram shows only one coloured component of the original light. The emer-

gent beam is characterised by a number of bright lines separated by intervals, and each element has its own peculiar spectrum. Thus if a sodium salt compound, such as common salt, is placed in a Bunsen flame, the light emitted is an intense yellow that is seen to consist of two yellow lines very close together in the visible spectrum. These lines are typical of sodium, and afford the most delicate test known for the presence of sodium in a mixture. The spectra of gases such as hydrogen, air, oxygen, helium, etc., may be observed by passing an electric discharge through a Geissler tube that contains the gas at a very low pressure. Discharge tubes of this type are usually of the pattern shown in Fig. 4. A and B are the two terminal electrodes, D is the point where the tube is finally sealed off after it has been repeatedly washed out with the gas and exhausted. The tube is sealed off when the pressure inside is of the order of $\frac{1}{10}$ millimetres of mercury; it is worked from a small induction coil (q.v.), A and B being connected to the secondary terminals of the coil. A luminous discharge takes place between A and B and the capillary



FIG. 4

tube C is 'filled' with the light that is characteristic of the element within. It may be remarked, in passing, that this form of discharge is now widely used in advertising signs. The brilliant orange-red signs are discharge tubes containing neon, and the spectrum of this element, as expected, contains a wealth of red and orange lines, together with a few yellow, green, and blue lines in the visible region.

A third type of spectrum is known as an *absorption* spectrum. This is characterised by absorption bands, which are produced by the absorption of light from the source by some interposed medium. During the last century Kirchhoff discovered that an incandescent body when relatively cold absorbs those radiations that it emits when hot. Thus if light from an ordinary electric lamp passes through a Bunsen flame impregnated with sodium, then since the flame is colder than the lamp, the yellow lines of sodium will be missing in the light that passes through the flame and the spectrum observed will be a continuous spectrum with two dark lines

spectrum was found to consist of the bright lines that corresponded exactly with the absorption lines in the solar spectrum. The spectrum of the moon's light provides certain evidence that the moon is a cold body that merely reflects the sun's light.

Refined Methods of Spectrum Analysis.—The wave theory of light (*see* LIGHT) was first propounded by Huygens, and his hypothesis was subsequently confirmed by Young and Fresnel at the beginning of the nineteenth century. Light waves of all wave-lengths travel at the same velocity, namely 186,271 m. per sec., *in vacuo*, but their velocities in transparent media such as glass are different for every different wave-length. Dispersion, or the splitting up of white light or any coloured light into its component colours by refraction through a prism, is due to this difference in their velocities in glass. There are two means of analysing light that are not only more refined than the method of prism spectroscopy already described but enable the wave-lengths of the different colours to



FIG 5

corresponding to the position of the sodium lines. In this way the dark lines of the solar spectrum are explained. The sun consists of a photosphere (*q.v.*), or incandescent body, surrounded by a chromosphere (*q.v.*) that is intensely hot, but cooler than the photosphere. The chromosphere contains many of the known terrestrial elements in a vaporised state, and as a result the solar spectrum is crossed by absorption lines corresponding to the lines of those elements. This is shown in a striking manner by Fig. 5, in which the upper spectrum is that of iron, obtained from an electric arc struck between iron electrodes, and the lower is the solar spectrum. The bright lines of the iron spectrum are marked in the figure by the black lines, while the absorption lines in the solar spectrum are marked by the white lines. It will be seen that all the intense lines in the iron spectrum correspond to intense absorption lines in the solar spectrum. It is interesting to note that the element helium was first discovered during the total eclipse of 1868 by spectrum analysis of the light from the sun, whence its name. Certain absorption lines in the solar spectrum could not be traced to correspond with any known terrestrial element. Confident that the missing element would be discovered later its name was given to it then and there. When Ramsay isolated the gas by fractional distillation of liquid air, in 1895, its

be measured. The first of these is *diffraction grating* spectroscopy. There are two types of diffraction grating: (1) the transmission grating, (2) the reflection grating.

(1) The best type of transmission grating is due to Rowland, who devised an engine for ruling fine lines on plate glass so close together that gratings having from 20,000 to 40,000 lines to the inch are made. The lines are equidistant and the rulings are identical in character. When a beam of light falls on such a grating diffraction takes place, owing to the fact that the rulings constitute obstacles of a size that is greater than, yet of the order of, the wave-lengths of light. If a parallel beam of light falls normally on the grating several spectra are formed. The direction in which the diffracted light of wave-length λ appears makes an angle θ with the normal to the grating, where $\sin \theta = n\lambda$, e being the distance between successive rulings of the grating and n being an integer. For $n = 1$, the spectrum formed is said to be of the first order. Measurements of wave-lengths are made by measuring θ for the given colours. The grating is substituted for the prism on the table of a spectroscope and the table is revolved until the plane of the grating is exactly normal to the axis of the collimator. The visible spectrum consists of light of wave-lengths between 4000×10^{-8} cm. and 8000×10^{-8} cm. approximately. The wave-lengths of the

two sodium lines in the visible spectrum are 5890×10^{-8} cm. and 5896×10^{-8} cm.

(2) Rowland's reflection grating is a concave mirror of speculum metal ruled in a similar manner to the transmission grating. The dispersion produced by such a grating is considerably greater than that produced by the transmission grating. Fig. 6 shows how the concave grating is used. The grating is rigidly mounted at

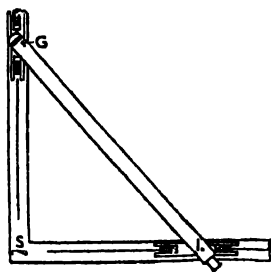


FIG. 6

G on the arm IG. The slit is at S, and this is illuminated by the light to be analysed. The light falls on the grating, and is diffracted in directions that depend on the wave-lengths of the components of the original light. IG is equal to the radius of curvature of the grating and the diffracted images are focused at successive positions of I as the arm GI is rotated in order to view any particular colour. The spectrum is viewed by means of an eyepiece as shown or photographed by means of a plate placed at I. Actually the wave-lengths can be read off quite simply, for it can be shown that $SI = \frac{n\lambda r}{e}$, where n is the order of the spectrum, λ the wave-length of the image formed at I, r the radius of curvature of the grating, and e the distance between successive rulings of the grating. Hence for a spectrum of given order, λ is directly proportional to SI and a wave length scale may be marked out along the beam SI. The spectrum formed by such a grating is often several feet long.

Superior even to this type of grating is the *interferometer*. Michelson (*qv*) and Fabry and Pérot are responsible for the two best types of interferometers. Fig. 7 shows the interferometer constructed by Michelson. The light from the source S falls on the piece of plate glass C, whose back surface is half-platinised, so that half the light is reflected to the mirror at A, platinised on its front face, and half through a compensating piece of plate-glass D to the mirror at B, also platinised on its front face. The light is reflected at A and B, and reaches the observer at O. In this way two beams originally from the same source are superposed. If the optical paths traversed by the two beams are identical or differ by an integral number of wave-lengths of the light examined, then reinforcement takes place at O, i.e.

the crests of the two sets of waves coincide and the effects of the two beams are added together. If, however, the optical paths differ by an odd number of half wave-lengths, then the crests of one set of waves coincide with the troughs of the other set and the resultant effect is the difference between the effects of the two beams. The observer can perceive when there is a maximum or minimum of brightness due to the *interference* of the two beams. Measurements of wave lengths are made in the following way. The screw T is made with the greatest care, and has a pitch of 1 mm, the table on which A is mounted can be moved backwards or forwards by means of the wheel W actuated by a worm wheel, so that a shift of $\frac{1}{500}$ mm can be read off from the divisions on the wheels. The observer moves A until, say, 500 successive maxima have been observed and counted. Then if the distance A has moved is d cm., we have $2d = 500\lambda$, where λ is the wave-length of the light. Monochromatic light is necessary for the source, this may be obtained by filters or by using a prism spectroscope without the eyepiece to get any particular line, whose wave length is required, as the source is.

Michelson's échelon spectroscope is another refined instrument for measuring wave lengths.

Ultra-violet and Infra-red Regions of the Spectrum—Light of wave-length less than about 4000×10^{-8} cm. does not produce any sensation of sight when it falls on the human eye, again, light of wave length

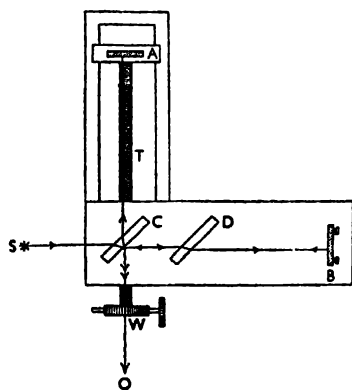


FIG. 7

greater than about 8000×10^{-8} cm. produces no response in the eye. The former is known as ultra-violet light, and the latter as infra-red light, and particular methods are required for investigation in these regions. When a body, such as a piece of metal, is heated it first emits infra-red light that is detected by its heating effect. Subsequently the body emits the longer visible red rays, and as it gets hotter still the whole visible spectrum and ultra-violet light are emitted and the body looks white.

Infra-red Spectrum.—A sensitive thermometer placed in the infra-red region is sufficient to detect the presence of an infra-red spectrum from a hot body, but in order to measure wave-lengths and intensities of the light in this region some delicate instrument is required. The spectroscopic used for this work has a prism of rock-salt that (unlike glass) is transparent to infra-red light. Lenses of this material may be used in the spectroscopic, but it is more satisfactory to use metallic mirrors in place of lenses for focusing the light. The concave diffraction grating is a most suitable instrument for this region of the spectrum. The eye is replaced by a radiometer or linear bolometer. The latter depends on the fact that the electrical resistance of a metal strip increases as its temp is raised. The infra-red light is allowed to fall on a thin strip of platinum, blackened to make it more sensitive as an absorber of radiation, suitably mounted and connected in an electrical circuit for the measurement of small differences of electrical resistance. In prospecting the infra-red regions with this instrument, the presence of a bright line is indicated by the kick of the galvanometer in the electrical circuit, and this also enables an observer to measure the intensity of the infra-red line. The longest infra-red waves measured are of the order of 6×10^{-3} cm.

Ultra-violet Spectrum.—The ultra violet spectrum was believed to extend from light of wave-lengths 4000×10^{-8} cm. that lies just beyond the visible violet to 1000×10^{-8} cm., but in 1920 Millikan succeeded in measuring wave-lengths of 1000×10^{-9} cm., and later research has revealed waves of length of about 200×10^{-9} cm. The existence of the ultra-violet spectrum was discussed as early as 1801, when Ritter found that silver chloride was most rapidly affected when it was placed beyond the extreme violet of the visible spectrum. Stokes in 1852 explained that Ritter's discovery was really the discovery of an invisible spectrum, and by means of the phenomenon of fluorescence (q.v.) exhibited by such bodies as uranium glass Stokes revealed the presence of a wealth of bright lines in the ultra-violet spectra of elements. It is generally known to-day that the number of bright lines in the ultra-violet region far exceeds the number of such lines in the visible spectrum. Since ultra-violet light is readily absorbed by ordinary glass, the usual form of prism spectroscopic is useless for the analysis of the ultra-violet spectrum. Quartz lenses and prisms may be used instead, for these are fairly transparent to a wide range of wave-lengths in this region. The concave grating is very suitable, and Fery's spectrograph is often used (see bibliography). Ultra-violet light affects photographic plates, and in mapping spectra in this region such a plate, enclosed in a camera, replaces the visual method adopted for the visible spectrum.

The Doppler Effect (see SOUND).—The fact that the bright lines in stellar spectra exhibit a shift towards the violet end of the spectrum if the star is moving in the

line of sight towards the observer is merely an example of the Doppler effect already explained in the article on sound. Similarly the lines are shifted towards the red if the star is receding in the line of sight. From measurements of these shifts it is possible to deduce the speed of recession or approach, it is also possible to determine the speed of rotation of the sun in this way, for the peripheral portions are moving in the line of sight towards or away from the observer. The existence of double stars rotating about their common centre of gravity, and too close together to be resolved by a telescope, is revealed by the Doppler shift of the bright lines in the spectrum.

Theory of Spectra.—The latter part of the nineteenth century witnessed a series of patient and exhaustive researches on the exact measurements of the wave-lengths of spectral lines. Scientists were confident that this was necessary work preliminary to a discovery of a theory of the origin of spectra. Every element has its own characteristic spectrum, chemical combination with other elements does not obscure the spectrum of the element itself. Hence the light emitted by a luminous element is atomic in its origin. It was hoped that a theory of spectra would soon be forthcoming that would reveal something of the nature of an atom, perhaps something sub-atomic. Actually the process was reversed, a theory of the structure of the atom preceded and led to the explanation of the origin of spectra.

By the process of trial and error Balmer, a secondary-school master in Switzerland, succeeded in 1885 in reducing the spectrum of hydrogen to some sort of law and order. He found that the wave-length λ of the bright lines in the spectrum of hydrogen could be expressed by a simple formula $\lambda = \frac{K m^2}{m^2 - 2^2}$, where K was a constant and m was given the values 3, 4, 5, etc. A more modern way of expressing the formula is $\nu = R \left(\frac{1}{2^2} - \frac{1}{m^2} \right)$,

where ν denotes the frequency and R is Rydberg's constant which is 3.291×10^{15} . Balmer conjectured that the spectrum of hydrogen might possibly contain other series of lines given by $\nu = R \left(\frac{1}{1^2} - \frac{1}{m^2} \right)$,

and $\nu = R \left(\frac{1}{3^2} - \frac{1}{m^2} \right)$, but the spectroscopic in his day was not able to detect such lines in the ultra-violet and infra-red. They were actually found later by Lyman and Paschen, respectively, and the series of lines corresponding to the last two formulae are called the Lyman and Paschen series. As an illustration of the application of the formulae take $m = 4$, in which case the value of the expression inside the brackets is $3/16$, and $\nu = \frac{3}{16} \times 3.291 \times 10^{15} = 617 \times 10^{14}$. The velocity of light is 299,796 km./sec., and the wave-length is found by dividing the velocity of light by the frequency so that the wave-length in this case is 4859×10^{-8} cm. It is usual

to express wave-lengths in terms of the Ångström unit (\AA), one Ångström being 10^{-8} cm., so that the wave-length in the case under consideration is 4859 Å. This is the well known H α line, and the wave-lengths of others can be found by assigning different integral values to m in the above formula. Balmer's law remained a simple but unexplained empirical law enabling the wave length of any hydrogen line in the above series to be computed when the wave length of one of the lines was known.

Then came the quantum theory (qv) and Rutherford's nuclear theory of the atom (*see* NUCLEUS). From these Bohr developed a theory of the hydrogen atom. His theory, put concisely, is as follows: (1) the hydrogen atom consists of a positively charged nucleus (the proton) round which an electron describes an orbit under the electrical attraction between the proton and electron. Expressed mathematically for a circular orbit we have $m \frac{v^2}{r} = \frac{e^2}{r^2}$, where m is the electronic mass, moving with velocity v in an orbit of radius r under the attractive force $\frac{e^2}{r^2}$, where e is the charge on the electron and on the proton. (2) Of the infinite variety of orbits that are possible according to the laws of classical dynamics, Bohr asserts that only those orbits are stable for which the angular momentum is an integral multiple of $\frac{h}{2\pi}$, where h is Planck's constant (*see* QUANTUM THEORY) and has the value 6.55×10^{-27} sec. erg. This second assumption of Bohr expressed in mathematical form becomes $mvr = \frac{nh}{2\pi}$, where n is an integer. Combining these two equations we obtain the radii of the stable orbits of the electron, viz. $r = \frac{n^2 h^2}{4\pi^2 m e^2}$.

(3) Bohr's last assumption is that the emission of radiation from the hydrogen atom follows Einstein's photo-electric law (*see* PHOTO-ELECTRICITY), $E_k - E_n = h\nu$, i.e. radiation of frequency ν is emitted when the electron jumps from one orbit where the energy of the atom is E_k to another nearer the nucleus, where its energy is E_n . In other words, the quantum of energy radiated is equal to the difference between the energies of the atom in its initial and final states. Now it may be shown that the energy of the atom when the electron is in the n th orbit is

$$C - \frac{2\pi^2 m e^4}{h^2} \cdot \frac{1}{n^2}.$$

Hence $E_k - E_n = \frac{2\pi^2 m e^4}{h^2} \left(\frac{1}{n^2} - \frac{1}{k^2} \right)$, where $k > n$. But $E_k - E_n = h\nu$.

Hence $\nu = \frac{1}{\lambda} = R \left(\frac{1}{n^2} - \frac{1}{k^2} \right)$, where R is the constant $\frac{2\pi^2 m e^4}{h^3}$. By these bold assumptions, Bohr reached the equation that is identical with that deduced by

Balmer from the observed facts. In other words, $\frac{1}{\lambda} = R \left(\frac{1}{n^2} - \frac{1}{m^2} \right)$ is explained. The

different terms inside the brackets correspond to the different energy-levels within the atom, and the process of emission of light by an element consists of (1) atomic excitation in which the electron is thrown out of its original orbit to one further removed from the nucleus, (2) the return to an inner level or orbit, while the energy corresponding to the difference between these two levels is radiated in accordance with the quantum theory. Bohr's theory, bold as it is, is justified quantitatively. Furthermore, its conclusions were strengthened by its applications not only to the spectra of other elements, but also to the interpretation of X-ray spectra of elements. X-rays are light waves of wave-lengths of the order of 10^{-8} cm., and the methods of X-ray spectroscopy are dealt with in the article on X RAYS. In spite of the success of the Bohr theory there were many details in the spectrum of hydrogen which it was unable to explain, but it would exceed the limits of space to deal with these. Since 1925 the Bohr-Sommerfeld model has been abandoned (Sommerfeld was responsible for various modifications, such as the introduction of elliptical orbits of electrons round the nucleus, hence his name is now associated with that of Bohr in the model of the atom). Nevertheless Bohr's theory is still used for many purposes, largely because the model was easily visualised while the newer theories are too abstract to be visualised. *See also* ZEHMAN LEFFER *See* A. Sommerfeld, *Atomic Structure and Spectral Lines*, 1923-1937, N. Bohr, *The Theory of Spectra and Atomic Constitution* 1924, R. A. Houston, *A Treatise on Light* 1924, A. Schuster and J. M. Nicholson, *The Theory of Optics*, 1924, G. Birtwhistle, *Quantum Theory of the Atom* 1926, R. W. Wood, *Physical Optics*, 1934, G. F. C. Searle, *Experimental Optics*, 1934, R. A. Sawyer, *Experimental Spectrography*, 1945, and L. C. Martin, *Technical Optics*, 1948.

Speculum Metal, alloy consisting of 126 parts of copper and 58.9 parts of tin. It is white in colour and takes a high polish. Formerly used for specula or mirrors of reflecting telescopes, it has now been partly replaced by silvered or aluminised glass.

'Speculum Perfectionis,' or the Mirror of Perfection, work by the Franciscan brother, Leo of Assisi, which gives the earliest written account of the life of St. Francis. It was written about 1227. A trans. is pub. in the Temple Classics.

Spee, Maximilian, Count von (1861-1914), Ger. admiral, b. at Copenhagen. In 1914 he was in command of the Far E. squadron, and on the outbreak of the First World War escaped from Chinese waters. On Nov. 1, 1914, he defeated Adm. Cradock at Coronel (*q.v.*), but on Dec. 8 his squadron was annihilated at the battle of the Falkland Is. (*q.v.*), S. himself going down with his flagship the *Scharnhorst*.

Speech. According to various scholars, S. is the use of articulate sound symbols

for the expression of thought. In Sir Alan Gardiner's opinion, this definition is only partly right. He considers S. as a universally exerted activity, consisting in the application of a universally 'possessed' science, termed language. Furthermore, in Dr. Gardiner's opinion, these two human attributes (language, the science, and S., its active application), have often been confused with one another or regarded as identical. S. is fundamentally a social activity of mankind; though many species of animals employ a kind of S., this is extremely poor and vague. *See also* ELOCUTION; LANGUAGE; LANGUAGE, ORIGIN OF; LANGUAGE, CLASSIFICATION OF; LINGUISTIC FAMILIES; LINGUISTIC SCIENCE; ORTHOGRAPHY; PHILOLOGY; VOCALISATION, VOICE AND VOICE TRAINING. *See* A. H. Gardiner, *The Theory of Speech and Language*, 1932 (with copious bibliography).

Speed, Harold (b. 1873), Eng. painter, b. in London, studied at S. Kensington and Royal Academy schools. His portrait paintings include King Edward VII, King Albert of Belgium, etc.

Speed Records, *see under* AERONAUTICS; MOTOR CARS AND MOTOR CYCLES; MOTOR BOATS.

Speedway Racing, form of motor-cycle racing on a shale or cinder track, usually about $\frac{1}{4}$ m. long, in the shape of an oval. The machines used for S. R. differ from ordinary motor-cycles, lightness being an important consideration. The loose surface of the track and the sharp bends make it a very thrilling form of racing. S. R. was begun in Australia and the U.S.A. after the First World War, and was introduced to Britain in 1923, where it quickly gained in popularity so that by 1936 there were over forty tracks and three leagues. S.R. has also spread to most European countries. A team consists of eight riders. Two riders from each team compete in a heat, the winner scoring three points, the second two, and the third one. A match usually consists of fourteen heats and the team with the greatest number of points are the winners. S. R. is unique among major sports in that it is the only one where betting is prohibited.

Speedwell, *see* VERONICA

Spenn, *see under* NEWBURY

Speer, Albert (b. 1905), Ger. architect and politician, b. at Mannheim. He joined the National Socialists and planned sev. public buildings for them. In 1942 he became chief of war production, and by 1944 had responsibility for all industrial output. He was sentenced to twenty years' imprisonment for war crimes at the Nuremberg trials.

Speler (Fr. *Spies*), tn. in the Rhineland-Palatinate, Germany, on the Rhine, $1\frac{1}{4}$ m. S. of Mannheim, and 21 m. S. of Worms. An anct. tn. S. became a free city in 1294, and was important in the Middle Ages and down to the seventeenth century. The Romanesque cathedral, one of the largest in Christendom, was begun in 1030; it was badly damaged in 1689 and 1793, and was restored in the nineteenth century. Other buildings of note are a tn. hall, museum, and picture gallery, and there is a fine

botanical garden. S. was the seat of the Imperial Chamber from 1527 to 1689. The diet of S. in 1529 was the origin of the term 'Protestant.' There are manufs. of tobacco, footwear, cotton, and tiles, and the tn. is a riv. port.

Speiss, crude arsenide of cobalt or nickel which is obtained on smelting the arsenical ores of these metals. A naturally occurring arsenide of cobalt with nickel and iron is called speiss-cobalt.

Speke, John Hanning (1827-64), Eng. explorer, b. at Jordans, near Ilminster, Somersetshire. In 1844 entered the Indian Army, and served in the Punjab campaigns. To S. fell the honour of being the discoverer of the Victoria Nyanza Lake, the source of the Nile. In 1859 he made public his discoveries in England, and gained the support of the Royal Geographical Society, which sent him on a second expedition with J. A. Grant in 1860. His *Journal of the Discovery of the Source of the Nile* (1863) has been reprinted in Everyman's Library.

Speke, locality 7 m. S.E. of Liverpool, England. There is an airport. Industries include one producing pencil and styromycin. The development of S. as an industrial estate and a tn. having 22,000 persons was planned by Liverpool City Council in 1936.

Speleology, scientific study of caves, *see* CAVE

Spelling Reform, *see* SIMPLIFIED SPELLING.

Spell, Magic, *see* INCANTATION

Spelt (Common Wheat), *see* WHEAT

Spelter, ingot zinc obtained by the smelter on remelting and casting the condensed zinc vapour. It is also the name given to an alloy of equal parts of zinc and copper.

Spemann, Haas (1869-1941), Ger. zoologist, b. at Stuttgart. He was successively prof. at Rosock Univ., a director of the Kaiser Wilhelm Institute of Biology in Berlin, prof. at and rector of Freiburg Univ. He did pioneer work in homology and evolutionary mechanics, gaining the Nobel prize for medicine in 1935. He pub. *Beitrag zu einer Theorie der Entwicklung* (1935) and *Forschung und Leben* (1913).

Spennborough, urb. dist. of the W. Riding of Yorkshire, 5 m. S.E. of Bradford. Machinery, textiles, carpets, plastics, belting, asbestos, wire, and leather goods are made. Pop. 36,600.

Spencer, family name of the earls of Sunderland, and of some of the dukes of Marlborough. The following were two prominent members of the family.

Dorothy Spencer (1617-84), countess of Sunderland. Edmund Waller the poet celebrated her in his verses as *Sacharissa*. She was married to Henry S., first earl of Sunderland.

Charles Spencer (1706-58), fifth earl of Sunderland and third duke of Marlborough. He was a soldier and a politician, fought at the battle of Dettingen, and was made lord privy seal (1755).

Spencer, Herbert (1820-1903), Eng. philosopher, b. at Derby. Descended from strong nonconformist stock, S. early showed

a disregard of authority and a reliance upon his own reasoning powers. The reading of Lyell's *Principles of Geology* determined his philosophic career by rousing in him opposition to views expressed therein. The first fruits of his studies were letters to *The Nonconformist* (1842) on social problems. They adumbrated his later concern with the theory of evolution and are remarkable for the individualism which distinguished all his social writings. As sub editor of *The Iconist* (1848-53) he made the acquaintance of Huxley, Lyndall, George Eliot and J. S. Mill and wrote his first important work *Social Statics* (1851). Thenceforth he was absorbed in the study of the development of the doctrine of evolution as applied to sociology, and he began to apply that doctrine in the *Principles of Psychology* (1855). Two years later he pub. a vol. of *Essays Scientific, Political and Speculative*, and while preparing these scattered writings for pub. he was aware that they were characterised by a unity of principle. In 1860 therefore he announced a *System of Synthetic Philosophy*, and a subscription list was opened with the help of Amer. admirers to meet the cost of the vols. to be pub. The work was not completed until 1896. It covers metaphysics, biology, psychology, sociology and ethics. The preparation of the first vol. *First Principles* (1862) had serious effects upon his health from this time his life was a struggle against ill health with spells of writing and enforced holidays abroad and his last years were clouded with disappointment and scientific hypochondria. Among his other writings are a famous vol. of four essays on *Education* (1861) which has been trans. into all the prin. languages of the world and even into Arabic and Mohawk; three vols. of essays and an *Autobiography* (1904).

Certain traits in S. have great bearing on his life's work. He was his own world and saw the universe completely outside himself as a separate entity; his intellect subdued all emotion and he was lacking in appreciation of art, poetry, hist., and the value of travel. He was agnostic and only late in life became mockingly tolerant of religion. Although as an engineer he considered he had done satisfactorily, an impatience with concrete details and an innate tendency to the most complete abstraction of general ideas probably prevented success. At the same time his mechanical turn of mind led him to attempt a purely mechanical philosophy. He chose all that added such a view which quite conscious that important views such as the origin of mind would remain outside his scheme. The key to his life's work the unifying formula for his vast range of abstractions S. found in von Baer's formula 'expressing the course of development through which every plant and animal passes—the change from homogeneity to heterogeneity'; he admits that it is probable his system of philosophy would never have been written had von Baer not written before him. He provided S. with the most abstract idea of evolution, and his

whole system consists in tracing this throughout a comprehensive view of the universe. Yet it is no more than an 'engineering formula in terms of matter, time and motion evading the mystery of time. See I. Kanck Bricauts, H. Sewall, *Herbert Spencer as a Biologist* 1886; F. H. Collins, *An Epitome of the Synthetic Philosophy* with introduction by H. Spencer 1889; H. Sidgwick, *Lectures on the Ethics of Green, Spencer and Martineau* 1902; D. Duncan, *An Introduction to the Philosophy of Spencer* 1904; Sir J. A. Thompson, *Herbert Spencer* 1906; and W. B. Hudson, *Herbert Spencer* 1916.

Spencer, John Charles Spencer third Earl (1782-1845). Eng. politician b. in London, educated at Harrow and Trinity College Cambridge. He became an M.P. in 1804 and in 1827, becoming a leader of the Whig opposition. As Viscount Althorp he played a prominent part in passing the 1832 Reform Bill. On his su. (1951) to the earldom in 1834 he retired from political life. See life by F. Myers 1830.

Spencer, Stanley (b. 1892). Eng. painter b. at Cookham on Thames Berkshire. He studied at the Slade School from 1910 to 1914, and served in the first World War. His military service produced its effect on his painting, especially as it rendered impossible for his greatest work the mural paintings of the Memorial Chapel at Bughurst. The side walls of the chapel depicted crowded and tragic scenes of military life while the l. wall shows the resurrection and relief from earthly burdens. For the remainder of S.'s work two sources are responsible: Cookham and the Bible and his pictures are a blend of the real and the imaginary. S. is primarily an illustrator and the story behind his work bears autobiographical detail. Among his other major works are the series *Christ in the Wilderness* blending the simple realities of nature with S.'s imaginative portrayal of Christ. *Sueh Lubbe and the Heavenly Visitors*. *Wickmen in the House* and *The Last Supper*.

Spencer Gulf, inlet of S. Australia about 200 m. long between Yorke and Live peninsulas. Wheat is exported from Augusta and Port Pirie.

Spender, John Alfred (1862-1942). Eng. author and journalist b. at Bath, and educated at Bath College and Balliol College, Oxford. Editor of the *Morning News*. Hull (1886-90) he joined the *Illustrated Weekly Gazette* in 1892 and was assistant editor of the *Westminster Gazette* (1893) and its editor (1896-1922). He was a member of the Royal Commission on Divorce and Matrimonial Causes and of the special commission to Egypt (1911-20). S. pub. *Comments of Bagshot* (1907). *Life of Sir Henry Campbell-Bannerman* (1931). *Life Journalism and Literature* (1932). *Life of 1st Viscount Coudray* (1930). *Memoir of Sir Robert Hudson* (1930). *Life of the first earl of Oxford and Asquith* (with C. Asquith 1932). *Fifty Years of Empire* (1933) and *Government of Mankind* (1938). See life by H. Willson Harris 1946.

Spender, Stephen (b. 1909). Eng. poet and critic b. in London, educated at Univ.

College school and Univ. College, Oxford. He served in the Sp. civil war, and in the London fire service during the Second World War. S. belonged to the circle of 'left-wing' poets of the 1930s. During the war his work, as with that of Day Lewis and MacNeice, tended to avoid the outer world, and turn to an inner subjective manner. In *Ruins and Visions* (1942) he searched for a universal experience by means of subjective contemplation, and in *Spiritual Explorations* (1943) attempted to penetrate to the true nature of human existence. His poetical works also include *Poems* (1933), *Vienna* (1934), *Trial of a Judge* (1938), *Poems from Spain* (1939), *Rejoice in the Abyss* (1945), and *Poems of Dedication* (1946). Critical writings include *The Destructive Element* (1935); *Life and the Poet* (1942), *The Creative Element* (1944), and *Poetry since 1939* (1947). He has also written the prose work *European Witness* (1946), and has trans. works of Toller, Rilke, and Lorca. From 1939 to 1941 he was co-editor of *Horizon*.

Spengler, Oswald (1880-1936), Ger. scientist and historical philosopher, b. at Blankenburg. He studied hist. and philosophy, finally evolving his own system of historical philosophy. In Munich he finished his main work, *Der Untergang des Abendlandes, Umriss einer Morphologie der Weltgeschichte* (1918-22, Eng. trans.). His pessimistic theory was that the different cultures of the world came to separate life independent of each other, achieved their climax, declined, fell and died, in identical cycles. He sees Europe in its decline, and fated to die. In a later book, *Jahre der Entscheidung* (1933) he tried, however, to find a certain way of European resurrection as a new structure under Prusso-Ger. leadership. His other books including *Preussentum und Sozialismus* (1920), *Der Mensch und die Technik* (1931), and a vol. of collected speeches (1937), are of less importance. S. greeted the rise of the National Socialists in Germany with enthusiasm in the preface to *Jahre der Entscheidung* but the Hitler regime could not digest his pessimistic doctrine, and his main work was suppressed. See life by A. Messer, 1924, also H. Scholz, *Zum Untergang des Abendlandes* (2nd ed.), 1921, O. Neurath, *Anti-Spengler*, 1921, M. Schrotter, *Der Streik um Spengler*, 1922, R. Thiel, *Die Generation ohne Mannen* (3rd ed.) 1932, E. G. Grundel, *Jahre der Überwindung: umfassende Abrechnung mit dem 'Untergangs'-Mayer*, 1934 and J. Wimmann, *Erwiesenes Abendland*, 1934.

Spennymoor, urb. dist. and parl. div. of Durham, England, 5 m. N.E. of Bishop Auckland. There are iron and steel works and coal mines in the vicinity. S. is also the centre of an agric. dist. Pop. 19,700.

Spenser, Edmund (c. 1552-99), Eng. poet, son of a reputed Lancashire cloth-maker who had migrated to London. He is the first Englishman after the Reformation to achieve a poetical work of the first order, and was the earliest of great modern writers in Eng. poetry. S.

was educated at Merchant Taylors' School, then a grammar school, under Dr. Mulcaster. In 1568 he was admitted as sizar (q.v.) at Pembroke Hall, Cambridge. The fierce religious passions of the age had their effect on S.'s mind and influenced those early compositions and trans. of Petrarch which are preserved in a treatise entitled *Theatre of Worldlings*, pub. by a Flem. refugee, Fel. John Noodt, predicting the ruin of Rome and Antichrist (c. 1569). S. seems now to have entered those student circles which were wrangling in pedantic disputations over Calvinistic theology. Though this was not the



EDMUND SPENSER
Engraving after a painting

atmosphere for the development of a great poet, it is probable that S.'s religious convictions were then, as later, in favour of the conforming puritanism in the Church as opposed to the extreme puritanism of Thomas (artwright (q.v.)). Little is known of S.'s career at Cambridge, but he took his master's degree in 1576 though his powers in Lat. composition were apparently poor, and his classical learning copious but inaccurate. It is known, however, that at Cambridge he formed a lasting friendship with two other students, Gabriel Harvey and Edward Kirke, the latter the first commentator of S.'s (at first anonymously) *Shepherd's Calendar*. Harvey was a distinguished classical and It. scholar, and considerably influenced S.'s ideas. In S.'s earliest poetry, the pastorals, Harvey is among the imaginary rustics, as the poet's 'most familiar friend,' under the name of Hobbinol, and to him the poet addresses his confidences under the name

of Colin Cloute, a name he borrowed from the satirist Skelton.

S. seems then to have spent some time in the N. of England, where he was occupied in poetical work and where he conceived a deep but unreciprocated passion. Though tradition has not preserved the name of this Rosalind who figures so often in his verse, he would seem to have continued to love her throughout all the vicissitudes of his life. By 1579 he was in London once more, had become acquainted with Philip Sidney and his coterie, and obtained a post in the household of Sidney's uncle, Lord Leicester. With Sir Philip Sidney, Dyer, and others, he formed a literary club, *Aeropagus*. It is evident that Sidney, like Harvey, influenced S. to waste his time in cultivating the artificial versification of the period. The letters he wrote at this time afford glimpses of his character and opinions, notably as regards the latter, his belief, later to be discarded, that Eng. poetry should be shaped on classical models. They also mention other compositions either lost or worked into his later poetry, such as *Slumber*, *Dreams*, *Epithalamion*, *Thamesis*, *Dying Pelican*, *Slemmata Dudleiana*, and *Comedies*.

Back in London again, he had come to realise his powers as a poet, and this in spite of the prevailing opinions and fashions. At the age of twenty-seven he had 'not only realised an idea of English poetry far in advance of anything which his age had yet conceived or seen' (Dean Church), but had already in his mind the outlines of his *Faerie Queene*, and perhaps written some portion of it. Shortly after taking up his residence at Leicester House he pub. (1579) the *Shepherd's Calendar*, which was well received. His worldly ease was assured in the following year when he was appointed secretary to Lord Grey de Wilton, then going as lord deputy to Ireland. In that country, holding various posts, he remained until within a month of his death, though he paid occasional visits to England.

In Ireland he was visited by Sir Walter Raleigh, who was his neighbour at Kilcolman, and the visit had important results. For he now renewed the old pastoral form of the *Shepherd's Calendar*, and described, under his customary poetical disguises, the circumstances which once more trans. him back from Ireland to the court, the goal of all who wished to make their way in the world. In this poem, *Colin Cloute's come home again*, is contained, besides lust, criticism, satire, and love passages, the interruption of his retired and 'pastoral' life in his Irish home by the appearance of Raleigh, the 'Shepherd of the Ocean.' At Kilcolman Raleigh became acquainted with S.'s work on the *Faerie Queene*, and his penetrating judgment told him how far the work was in advance of any preceding Eng. poetry. Thus the historic visit led directly to the pub. of S.'s masterpiece. Previously S. had written an elegy on Sir Philip Sidney (*Atrophel*), who died in 1586. It was three years later that he completed the first three books of the *Faerie Queene*,

which had been actually begun so early as 1579. The next three books appeared in 1596, the year in which he wrote his *Prothalamion*.

S. is in letters the lineal descendant of Chaucer, and the *Faerie Queene* is the next great poem, in chronological order, to the *Canterbury Tales*. The *Shepherd's Calendar* consists of twelve pastorals on the months with much moralising and satire, but no scenic description. The *Faerie Queene*, in quite a different order of thought, is a reflection of the great Elizabethan age. It begins as a story with twelve knights of Gloriana (Elizabeth), who undertake various adventures in her honour; but far from continuing the narrative, S. diverges into fantasy, a mosaic into which he weaves deeds of chivalry and interweaves with grave moralising. The symbolism at the back of the fabric music is not the strong feature of the work, but the adventures of the Red Crosse Knight and his Una are, of course, symbolical of the eternal conflict between truth and falsehood. Though S. was deeply interested in the great movements of his age, and enthusiastically cultivated the 'new learning,' a genuine poetic impulse was the mainspring of his writing. His freshness and wealth of imagination, his great power of language, rhyme and rhythm, have gained him the title of 'the Poets' Poet.' No one lived more constantly in the world of imagination. Shakespeare, Milton, Dryden, and Pope all owe a debt to S., and in the nineteenth century enthusiasm for his work revived, and was avowed by Thomson, Wordsworth, Byron, Shelley, and Keats. Whatever his defects, he is a poet of exceptional charm, and has been one of the strongest influences in Eng. literature.

There are collected eds. of S.'s works by J. Aikin, 1812, R. Morris and J. W. Hales, 1869, A. B. Grosart, 1882-94, W. L. Renwick, 1925-34 (incomplete), and E. Greenlaw, C. G. Osgood, and F. M. Padelford, 1932-39, and of his poetical works by R. E. N. Dodge, 1908, and J. C. Smith and E. de Selincourt, 1909-10, 1912. See also lives and studies by R. W. Church, 1879, E. Legouis, 1926, W. L. Renwick, 1927, B. E. C. Davis, 1933; Janet Spens, 1934; C. S. Lewis, 1936; J. W. Bennett 1943, and A. C. Judson, 1946.

Spermatozoa, see BIOLOGY, *Embryology*, *EMBRYOLOGY*; **REPRODUCTION**.

Sperm Oil, or **Spermaceti Oil**, obtained from the sperm whale or cachalot (*q.v.*). The crude oil is yellow to dark brown in colour, and has a fishy odour. Spermaceti separates on cooling, and the clear yellow oil which is left is purified by treatment with potash. S. O. forms a valuable lubricant for delicate machinery since it does not readily become rancid or gummy. Spermaceti is used in ointments, candles, and textile dressing.

Sperm Whale, see CACHALOT; **WHALE**.
Sperry, Elmer A. (1860-1930), Amer. inventor, b. at Cincinnati, New York. He made electrical experiments and later estab. a plant in Chicago for the manuf. of a new form of electric arc light. He followed

this with electrical mining apparatus and electrical locomotives. Later he developed the high intensity arc searchlight, which had five times the brilliance of any previous artificial light. This searchlight became the standard for the prin armies and navies of the world and has been used for many commercial purposes. The S high intensity arc was also utilised in the cinema world, where it revolutionised production methods both in the photography itself and in the projection of the film upon the screen. S was the leader in the application of the gyroscope (q1 and see under NAVIGATION) to practical uses. His gyro compass, which first underwent successful trials in the U.S.S. *Delaware* in 1911, was quickly adopted by the R.N. and other leading navies of the world, following the First World War it became a piece of standard equipment in the world's merchant fleets. His gyroscopic ship stabiliser reduced the roll of vessels at sea to small proportions, and was put to good use in a number of yachts and naval vessels. With his son Lawrence he developed a gyroscopic aircraft automatic pilot that won the award in Paris in 1914 for safety in flight. This auto pilot was far ahead of its time, but led to the development of such instruments as the artificial horizon, directional gyro, and gyro magnetic compass, and indeed of the modern aircraft automatic pilot.

Sperrylite, arsenide of platinum, PtAs, which occurs associated with nickel at Sudbury in Canada.

Spetsa, see SPFFZIA.

Spey, *ric* in Scotland, one of the swiftest in Great Britain, and noted for its salmon. It flows through Inverness Banff, and Moray, and enters Moray Firth at King's Head. Whisky is produced in its vicinity. Length 110 m.

Speyer, see SPEIER.

Spezia, La 1 Prov. of Italy in Liguria, situated round the bay of the same name. The chief products are wine, fruit, olive oil and marble. Area about 354 sq m. Pop 122,600. 2 Cap. of the prov. of the same name 56 m S.E. of the town of Genoa. It became the prin station of the It fleet and chief It arsenal with a school of navigation. It is a noted winter resort and is also visited in summer for sea bathing. In the bay Shelly was drowned. Manus include iron and leather goods, furniture and sailcloth. The cathedral was badly damaged the roof, nave N aisle, and facade being destroyed, and also the harbour in the Second World War. The city was captured on April 24, 1945. Pop 111,700.

Spezia, **Spetsa**, or **Petsa**, is of Greece, at the entrance of the gulf of Nauplia, 10 m S.W. of Hydra. It contains a small port called S.

'S. P. G.', see SOCIETY FOR THE PROPAGATION OF THE GOSPEL IN FOREIGN PARTS.

Sphagnum Moss, genus popularly known as bog-mosses, because they inhabit damp, boggy spots and retain a considerable quantity of water in their leaves and branches. Masses of S.M. thus saturated with water form peat-bogs. The mosses

have erect stems and bear the male and female organs on separate lateral shoots. S.M. is used for surgical dressings.

Sphakia, tn on the S coast of Crete, 57 m W. by S of Candia.

Sphene, or **Titanite**, silicate of titanium and lime occurring in gneisses and schists and other metamorphic rocks. In colour it is dark brown, crystallises in the monoclinic system, and displays strong double refraction (hardness 5, sp gr 3.5).

Sphenodon Punctatus, or **Hatteria Punctata**, New Zealand lizard called *Inatara* by the Maoris, the only living member of the Rhynchocephala, one of the five chief groups of existing reptiles. It has a long compressed tail and is less than 2 ft in length. The body is covered on the upper part with small scales and tubercles, a crest of spines running the length of the back, the fore and hind limbs each bear five clawed and webbed toes. It is amphibious in habit but usually spends the day in a burrow of its own excavation, hunting for insects, crustaceans, worms, and even small fish by night. The eggs are deposited in sand and usually take more than a year to hatch. This reptile has traces of a median third eye situated on the roof of the brain corresponding in its position with that of the pineal gland of vertebrates generally.

Sphenoid Bone, wedge-shaped bone across the base of the skull near the middle and helping to form the cavity of the cranium, the orbits and the posterior nares.

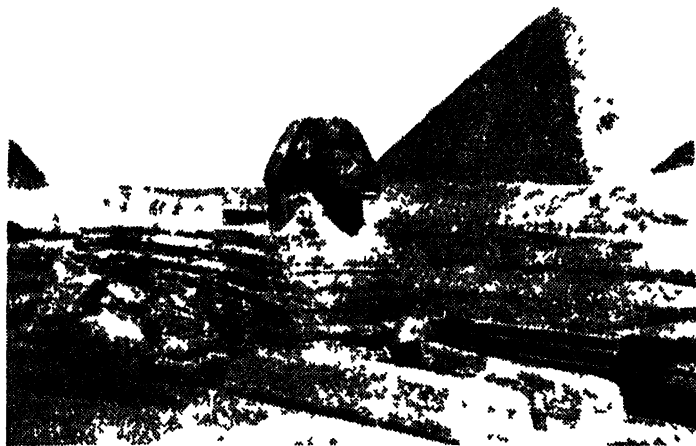
Sphere, solid body produced by the revolution of a semicircle about its diameter. This may be seen by spinning a penny very rapidly on a table when it will present the appearance of a S. From this it is clear that every point on the surface is equidistant from the centre of the gyrating semicircle, this point being called the centre. From this property of a S the following mathematical definition of a S will be obvious: a S is a surface every point of which is at a constant distance from a fixed point—the centre. The distance from the centre to the surface is called the radius. Any section through the centre of the S is called a great circle; any other section being called a small circle. Clearly all great circles on the same S are equal to one another. The points where the diameter of the S normal to a section meets the surface of the S are called the poles of the section. On the earth's surface parallels of lat are small circles, the N and south poles being the poles of all these circles.

'Sphere, The', weekly illustrated paper estab. in 1900 by Clement Shorter (q1) at a time when S. African war pictures were much in vogue. It was launched as a sixpenny pub., but now, after fifty years, it is two shillings in price. In 1912 it incorporated *Black and White* (q1) and in 1932 the *Graphic*. It reproduces topical drawings in wash or line, many topical photographs, together with topical articles and comment on current affairs.

Sphere, The Celestial, in astronomy is the infinitely distant surface, part of which forms the dome of the sky, on which we

see the heavenly bodies projected. The eye of the observer is the centre and its variation in position does not affect the position of the surface on account of its infinite distance. The aspect from the earth's equator, when the poles are on the horizon, and heavenly bodies rise and set vertically, is known as the right S., that from the poles is known as the parallel S., motion being parallel to the horizon, from any other position it is oblique. The positions and tracks of the heavenly bodies are referred to it by two systems of co-ordinates. In one the equator is taken as the fundamental plane, in the other

fractional or imaginary. Thus $\frac{1}{r}$ is a spherical harmonic of degree -1 where $r^2 = x^2 + y^2 + z^2$. This may easily be proved by performing the partial differentiations according to Laplace's equation, and adding together the results when they will be found to be zero. Sometimes the function is written in polar co-ordinates in the form $r^n f(\theta)$ where θ is the inclination of the radius vector to the fixed initial line. In this case the function is called a *zonal or zonal spherical harmonic*. Owing to the frequent appearance of



THE GREAT SPHINX AND GREAT PYRAMID

Egyptian Desert

less commonly used the ecliptic is taken as the fundamental plane. The ecliptic is the trace of the earth's orbit in the C.S. The finite distances of the stars are known by their proper motions as observed on the C.S. Proper motion is the rate of change of position of a star on the C.S., and is unappreciable for the very distant stars. For crystalline S. see PROTEIN CRYSTAL.

Spherical Aberration, see ABERRATION.

Spherical Harmonics, name given by Lord Kelvin and Prof. Lamb in their *Treatise on Natural Philosophy* to any homogeneous function of (x, y, z) which satisfies Laplace's Equation. Laplace's

Equation takes the form of $\frac{d^2 V}{dx^2} + \frac{d^2 V}{dy^2} + \frac{d^2 V}{dz^2} = 0$. When V is some function of (xyz) it is often written shortly $\nabla^2 V = 0$. Now if V is a homogeneous function of (xyz) then V is called a spherical harmonic. The degree of V may be any positive or negative integer or it may be

Laplace's equation in the higher branches of mathematics the subject of S.H. forms a very important branch in the attempts to solve this equation.

Spheroid, name given to those bodies of revolution obtained by revolving an ellipse about either its longer or shorter axis. If revolved about the longer axis the S. is called *prolate*, and if about its shorter axis it is called *oblate*. The earth is an oblate S., the polar diameter being nearly 27 m. shorter than the equatorial diameter.

Spherulitic Structure, see PHOTOMICROGRAPHY.

Sphex, typical genus of the family Sphecidae belongs to the Hymenoptera, and contains about 200 species. These wasps burrow in the ground and deposit there, as food for their larva, the paralysed bodies of crickets and grasshoppers. *S. lobatus* is a native of E. India.

Sphincter Muscles those whose action opens or closes certain orifices. The *sphincter ani* (external) closes the anus, the *sphincter ani* (internal) constricts the rectum, the *sphincter pyloricus* closes the

pyloric orifice of the stomach the *sphincter vesicae* constricts the urethral orifice of the bladder

Sphinx, fabulous monster figuring in both Gk and Egyptian mythologies but probably of Egyptian origin. In Egypt it is represented as a wingless lion with a human head whereas in Greece it is a winged lion with female bust. The most famous example is the Great S of Gizeh near the group of pyramids a rock carved into the shape of a human headed lion, 189 ft. long and probably the work of the Fourth Dynasty. The face looks out due E over the Nile valley. The S was dug out in the Eighteenth Dynasty and venerated as a sun god. The S of Sais, formed of a block of red granite, 22 ft. long is in the Egyptian museum of the Louvre. Ss have also been found in Assyria and Phoenicia and representations are common on Persian gems. In Gk mythology the most famous S was that of Thebes in Boeotia with a woman's head, lion's body, bird's wings and serpent's tail sent by Hera from Ethiopia to Phobos. She set the inhabitants a riddle and devoured all those who could not solve it. It was at length solved by Oedipus and the S destroyed herself. (See illustration p. 817)

Sphinx Moth, see **HAWK MOTH**

Sphygmograph, instrument for recording the movements of the pulse and hence the variations in blood pressure. The movement of the radial artery at the wrist is communicated to a lever which rests upon the skin. The movement is magnified by a system of levers and is communicated to a pointer or stylus in contact with a smoked surface moved by clockwork at a uniform speed. The sphygmogram or record inscribed by the instrument exhibits a wavy line the down-stroke represents the time during which the blood is flowing from the artery's distal end; the up-stroke records the increase of pressure that is the inflow of blood into the artery from the heart.

Spica, see **BANDAGES**

Spica (a Virginis), bright star (magnitude 1.2) in the ear of wheat held by the Virgin in the zodiacal constellation. In 1890 Vogel found that it was a spectroscopic binary. It is of the helium type and it revolves round its bill but massive companion in approximately four days at about 60 m. a sec. S would appear to be approaching the earth at about 10 m. a sec. Its distance is just over 100 light years and its luminosity 110 times that of the sun.

Spice Islands, see **MOLT CAIS**

Spicer-Simson, Theodore (b. 1871) Eng. sculptor and medallist. He is the son of Eng. parents and settled in France. He studied in Paris at the École des Beaux-Arts under Millet, Thomas and J. Dampst. He first exhibited at the Old Salon Paris the Royal Academy and the New Gallery in 1896 and, from 1901 at the New Salon or Société des Beaux-Arts of which he was elected an associate in 1901 and later a full member. He is among the best known of Eng. medallists and specimens of his medallions and portrait reliefs are to be found as part of the permanent col-

lections of all the prin. museums in Europe and in the U.S.A. His work is well known to collectors and connoisseurs and reveals a high degree of skill and imagination. Being poet, philosopher and art critic as well as sculptor, S's favourite subjects have been Eng. men of letters. Among the best of his numerous designs of portrait reliefs and medallions are those of George Meredith, Thomas Hardy, H. G. Wells, G. B. Shaw, Joseph Conrad, G. I. Watts, Paderewski, John Galsworthy, Lord Rutherford, G. F. Hill, Count Hermann Keyserling, etc. His images of women include Mrs. Shaw, Lady Gregory, Marian Laird, and his wife Margaret S. His work assimilates admirably the style



A PORTRAIT MEDAL BY THEODORE SPICER-SIMMON

of the great It. portraitists of the fifteenth century whose essential characteristics are boldness of design, an vivid in the spirit of the medallist art with neglect of superfluous detail. His success is largely due to an extraordinary softness of touch, and great accuracy and dexterity in the moulding of his plastic. A commemorative medallion in memory of America's entry into the First World War was his design as also were those of various other notable Amer. medals of award. His larger works include an 8 ft. statue of the martyr of Bobbili in India and life-size busts of Earl Selborne in Johannesburg Art Museum and Moncur Corway in South Place Chapel, London. See *Stewart P. Sherman Men of Letters of the British Isles* (28 portraits of well-known authors in Great Britain).

Spices, certain vegetable products such as pepper, cinnamon, cloves, nutmegs, caraway, etc., which are used for flavouring foods. They all contain an essential oil which gives to the substance an aromatic odour. They are derived from various parts of plants: the fruit, the seed, the stem, the flower bud, the bark, and the root. Eastern Ss were extensively used in medieval times, since salt meat

and salt fish were much eaten. See H. S. Redgrove, *Spices and Condiments*, 1933.

Spider Crab, see CRAB.

Spider-fly, term applied to all members of the parasitic families Hippoboscidae, Braulidae, Streblidae and Nycteribiidae which constitute the group Pupipara. Externally they are much like spiders and they live usually by sucking the blood of bats, bees, birds, sheep, and other animals.

Spider Monkey, see ATLAS.

Spiders (Araneidae), large and very varied order of Arachnida (qv). Their most striking characteristic is the possession of a set of glands secreting a viscid fluid which hardens by exposure to the air, and forms a silky thread. These glands are numerous and their secretion is made through many minute tubes on the under surface of the spinnerets at the end of the abdomen. By means of their silky threads S. construct their dwellings, some of them highly specialised and many of great beauty. These make webs and traps for the capture of prey, they serve for aerial transport and are used as a safeguard against falling. Not all S. use webs, however, e.g. the wolf and the crab S. are oviparous and the female encloses her eggs in a silk web which sometimes is curled about with her, sometimes concealed in the nest, and sometimes attached to solid objects. The young do not undergo metamorphosis. S. are predaceous and bury the claw joints of their fangs in the body of the prey and then suck out the juices and soft parts. A very large number of species, mostly of small size, are known, but a few tropical forms attain great size. Probably the most feared arachnids which kill all S. are poisonous and their bite in cause local inflammation but not the extraordinary symptoms associated with the wood tick. The water S. (*Trogdoneta aquatica*) is remarkable for constructing a web below water, a bubble of air entangled in the web serves as a 'diving bell'. Wolf S. (*Lycosidae*) are a widely distributed form of predaceous S. of the tribe Dipneumonae. Many of the species are found in woods and dry commons, others, as *Lycosa pratensis* are aquatic. See F. H. Savory, *The Biology of Spiders*, 1925 and J. Crompton, *The Spider*, 1940.

Spiderwort, see IRIDIACEAE (I. BRIT.).

Spigelia, Amer. genus of Loganiaceae containing over two dozen species. *S. marilandica* is the pink root (qv).

Spike Island, is on the W. side of Cork Harbour, to the S. of Haulbowline Is., and $\frac{1}{2}$ m S. of Cobh (Queenstown) Eire. It was formerly the main convict prison. Pop. 600.

Spikenard (*Nardostachys jatamansi*) perennial herb of the order Valerianaceae also called nard. It has little spikes of purple flowers in dense clusters and a short thick very fragrant rootstock. The aromatic substance derived from the rootstock was much prized by the ancients as an unguent and is also used in medicine as a stimulant. It is a native of the

Himalayas but will grow in ordinary soil in Great Britain.

Spilsbury, Sir Bernard Henry (1879-1947), Eng. pathologist, educated at Univ. College School, Manchester Grammar School, Magdalen College, Oxford, and St. Mary's Hospital, London. He became lecturer in special pathology at St. Bartholomew's Hospital, London, and was elected fellow of the Royal Society of Medicine. For many years S. was pathologist to the Home Office and achieved much renown. He gave evidence in many murder trials and was univ. in forensic medicine, one of his earliest cases being that of Crippen.

Spilsby, mkt. tn. of Lincolnshire, Eng. land, 14 $\frac{1}{2}$ m S. of Louth. There is a grammar school and a fourteenth century church. The tn. trades in agric. produce. Pop. 1600.

Spina Bifida, congenital cleft in the lower part of the vertebral column. It usually consists of a defect in the arches of the lumbar vertebra with the result that the spinal fluid in its enclosing membrane protrudes and causes a variety of *hydro-rachis*. The condition is apparent at the surface in the form of a soft protuberance at the lower part of the back.

Spinach, or *Spinacia oleracea*, species of Chenopodiaceae which grows wild in the field. The plant is herbaceous and the leaves are eaten as a vegetable.

Spinal, see NERVE.

Spinal Paralysis, see PARALYSIS.

Spindle-tree, name applied to various species of *Lyonurus* (qv). A genus which flourishes in N. lands. *P. europaeus* is a native of Britain and is known also as the dog wood and cat tree.

Spine and Spinal Cord. The spine, backbone or vertebral column consists of a number of small bones called vertebrae, which number thirty-three in the human infant but only twenty-six in the adult. The groups of vertebrae in the infant are: the cervical seven in number, dorsal or thoracic twelve in number, lumbar five in number, sacral five in number, and coccygeal or caudal four in number. In the adult the five sacral vertebrae become fused together or ankylosed to form a single bone, the sacrum, while the four coccygeal vertebrae blend together to form the coccyx. The whole column forms the axial support of the body. It supports the skull at its summit, the ribs articulate with the thoracic vertebrae and help to support the upper limbs, while the pelvis forms a girdle with the sacrum and serves as a support for the lower limbs. The vertebrae vary considerably in shape but each possesses a body and a arch. The body is a cylinder which is connected above and below with the adjacent vertebra by a disk of fibro cartilage which acts as a buffer in absorbing shock. The arch consists of two halves which spring out to unite medially behind thus forming a ring. The whole succession of the rings forms the spinal canal or channel containing the mass of nervous matter known as the spinal cord. The average length of the spine is about 28 in. Viewed from the side it presents a series of curves, the

curvical portion presents a convexity forward the thoracic a convexity forward and the lumbar a convexity forward and the coccygeal a convexity forward. This curvature serves to maintain the strength of the structure and adapts itself to the various movements of the body. The spinal cord occupies the upper two thirds of the spinal canal. It is protected by three membranes (1) meninges; the dura mater, which is a continuation of the meningeal layer of the cranial dura mater; the arachnoid, a delicate membrane which is separated from the innermost layer by the subarachnoid space; and the pia mater, a membrane which follows the surface of the cord closely and sends processes into it. In the subarachnoid space is contained the cerebrospinal fluid. The cord itself consists of a cylinder of grey matter and white matter with the white matter arranged outside. If a section of the cord be made the grey matter can be seen in the form of a crescent on each side united in the middle by the grey commissure. Through the commissure runs the central canal which (like the ventricles of the brain) is filled with cerebrospinal fluid. The white matter is partly divided into two by the anterior and posterior median fissures; each side is therefore divided into three columns by the crescent of grey matter, the three columns being called anterior lateral and posterior. At its lower end the spinal cord tapers off into the filum terminale which together with the lowest pairs of spinal nerves constitutes the cauda equina (mare's tail). It is in this region that cerebrospinal fluid can be drawn off by means of a lumbar puncture.

Injuries and Diseases—Fracture of the spine occurs when the vertebrae are separated by direct or indirect violence. It involves tearing or crushing of the spinal cord with the result that parts below the seat of the injury are deprived of sensation and of the power of movement. The patient may linger for some time but no surgical treatment is of avail. Such an accident is naturally most serious in the cervical region, where it is called 'breaking the neck'. Curvature of the spine may result from various causes, among which perhaps the most serious is tuberculous ulceration of the vertebrae. The bodies of the vertebrae are eaten away by the disease so that they become unable to bear the weight of the upper part of the column and collapse on each other producing the appearance of a hump posteriorly; this is 'Pott's disease' or spondylitis; the latter term is also used for arthritis of the spine which causes it to become rigid (see HYPOCHACK). Lateral curvature (scoliosis) sometimes occurs in the young through unsymmetrical development caused by injury or bad habits of sitting etc. It may be corrected by appropriate exercises. Spinal meningitis, or inflammation of the membranes of the cord, may occur in tuberculous and acute infectious diseases as a part of cerebrospinal meningitis, etc. It is characterised by fever, exaggerated reflexes, and later paralysis.

Spined Loach, see GROUNDLING

Spinel, mineral group of the cubic system, which consists of spinel and magnesite, with more or less of the latter replaced by protoxide of iron, lime or protoxide of manganese, and the alumina in part by sesquioxide of iron. Thus there is a gradation into kinds with little or no magnesite and which stand as distinct species (hercynite and gahnite). Colour is variable (hardness 8). Well known stones are ruby (magnesite) and garnetite, franklinite and picotite.

Spines, in botany are hard sharp pointed outgrowths which have a protective function. They are in reality modifications of various organs e.g. of bristles in the hawthorn leaves in the barberry and stipules in the locust tree.

Spinnet, keyboard instrument of the harpsichord family but smaller and probably named from a fancied resemblance of its quill plectra to spines or thorns (it *spinetta* dimin of *spina* thorn).

Unlike the double and triple stringed chord (*qr*) the instruments derived from the psalter (*qr*) could only present one string to the mechanical plectrum which twanged it. These instruments include the virginals and keyed dulcimer or clavichordium (harpsichord) as well as the *S*. The *S* though like the harpsichord family in this respect differed from the virginal in being wing shaped instead of rectangular but the oldest *S* known that made by Francesco di Pontalupis at Verona (1523) was pentagonal. 11 strings of the *S* were placed at an angle of about 45° with the keys and as described by J. C. Schaller (1784) were sounded by being plucked by quill plectra.

As to the kind of plectra earliest used there is no evidence but Schaller mentions the little crow quill points as having been introduced when he was a boy. The origin of the name *S* is not definitely decided though the above noted derivation seems the most plausible and is that given by Schaller in *Fach* s (pub. posthumously 1801). Some however derive the word from the name of Giovanni Spinetti (fl. 1500) a Venetian maker of musical instruments and inventor of an oblong form of the *S* (which should not be confused with the early oblong form of the piano). The clavichordium was a *S* with the strings perpendicular like those of an upright piano. The *S* was a favourite instrument in the sixteenth to eighteenth centuries and was also manufactured in America during the eighteenth century. See also HARPICHOORD, PIANO, 1011.

Spingarn Joel Elias (1875-1933) American author b. in New York. He was prof. of comparative literature at Columbia Univ. (1899-1911) and was a literary critic. President of the National Association for the Advancement of Coloured People from 1930. In 1914 he founded the award of the Spingarn Medal granted annually to an outstanding Negro. His writings include *A History of Literary Criticism in the Renaissance* (1899), *The New Criticism* (1911), *The New Hesperides and Other Poems* (1911), *Poems* (1924), and *Creative Criticism and other Essays* (1931).

Spinning, see COTTON SPINNING AND MANUFACTURE

Spinning (of metal), see under METALLURGY (FABRICATION OF METALS)

Spinoza, Baruch (1632-77), Dutch philosopher, b in Amsterdam, of Portuguese Jewish descent, the family name being Espinoza or Despinosa. He was educated in Amsterdam under Manasseh ben Israel and took Dutch nationality and his religious views estranged him at the age of twenty from the Jewish community in Holland. S made his living by teaching and grinding optical lenses. He lived near Leyden from 1660 to 1663 and there began to formulate his own philosophy. From 1663 to 1670 he lived near The Hague, is moving to that in 1670. He suffered much during the II invasion of Holland in 1672 and developed pulmonary consumption from which he died. S refused a chair of philosophy at Heidelberg the better to preserve his leisure and freedom. He lived a solitary and abstemious life, but was on good terms with those who shared his intellectual interests, and was an assiduous correspondent besides being a firm patriot.

His Heb. learning enabled him to become the founder of the historical explanation of 'the criticism' of the Bible. In regard to his religious teaching S held the views that it is literature and not dogma; that it is a criticism of life to the effect that conduct is the chief thing therein and that the eternal makes for righteousness. S's philosophy set out in axioms and propositions in the purificationist style is founded on a rationalist Judaism, the dualism of Descartes reconciled into monism and the ideas of Hobbes. He defined the final causes or purposes of work in nature, and denied in his ordinary sense immortality of the soul free will and moral responsibility. Nature and God are identified and all things good or bad in human eyes are integral parts of the divine being. If the fortunes of a man depend solely on God's will then all things must necessarily be agents of his will; he is the only power at work and everything is an expression of his will and nature. His political theory may be called Nietzschean; he propounds as an observable truth of natural lust that might makes right. Good and evil are relative to finite and particular interests but in the absolute the distinction is transcended.

Man's reason may be powerful enough to support only those of his habits and passions which are destined to success. This renunciation of the impossible is what S calls happiness and it is this knowledge and love of the universe that all his maxims aim to secure. The solid and humble well being which he promised to those who accepted his teaching exactly reasserts the kind of hope and aspiration which occurs so frequently in the older parts of the Bible. He departed furthest from Jewish ideas and approached, perhaps unawares, those of the Greeks in his doctrine of human freedom and immortality. In their ordinary acceptance these are excluded from his fatalistic

system since everything that happens is inevitable pre-ordained and predictable. I or S freedom meant power, that a man's nature consistent and unified should be able to express itself clearly in his thought and work. Immortality means a quality of life produced by the intellectual essence of a man's thought for a man who understands himself 'under the form of eternity' knows the eternal quality that belongs to him since when his life is over the truth of his life remains part of the infinite context of facts.

S's philosophy reaches its highest point in his physics. Natural science could alone reveal what was fundamental and in his view divine. The two regions where science could come into contact with nature were mathematical physics and self-consciousness. His detailed scientific speculation is antiquated but he reached the valuable concept of the absolutely infinite in which universe man was the most incident.

The two works pub in his lifetime were *Renati des Cartes principia philosophiae* (*Mora geometrica*) (*demonstrata*) (1663) and *Tractatus theologico-politicus* (1670). His works were pub the year of his death, there is a denudated by A. in Volen and I and (1887-8, 1890) and the best ed is that by C. Charrat (1920). An Eng. trans. of the complete works was begun in 1928 by A. Wolf with a vol of his correspondence and there is a trans. of the *Ethics*, etc. by A. Boyle (Ivy Press Library 1910). S. by S. and studies by S. L. Pollock (1880-1891). J. Martin in 1882 W. Knight 1882 A. B. Moss 1885 M. H. Friedlander 1887 J. C. and 1888 W. J. Collins 1889 R. A. Duff 1903 J. Iyer 1904 L. L. Powell 1906 J. M. Robert on 1907 R. McKen 1908 J. Poth 1929 C. Gebhardt 1932 R. Kasser (Eng. trans. 1947) and A. Zwarg 1948.

Spion Kop, hill in Natal S. Africa in the Tugela R. some 18 m S.W. of Ladysmith. During the siege of the latter in the S. African war S. K. was the scene of a battle on Jan 24-25 1900 being captured by Brit troops but abandoned as untenable.

Spiraea genus of Rosaceae found in N. lands. It contains about forty species, six of which are cultivated in Britain as flowering plants. *S. ulmaria* (or *Ulmara palustris*) is the fragrant meadow sweet or queen of the meadow. See also DROU WORT.

Spiral (curve) name given to curves which wind around a point in successive convolutions the curve recedes more and more from the point which is called the centre. These curves are best represented in polar co-ordinates, the centre being taken as the pole. The simplest is the equiangular or logarithmic spiral which possesses the property that the tangent at any point makes a constant angle with the radius vector. Its polar equation is $r = ae^{b\theta}$, and if a be the constant angle between the tangent and radius vector, $\tan a = \frac{r d\theta}{dr} = \frac{1}{\log a}$ or $\cot a = \log a$.

From the original equation of the curve $\log r = \theta \log a = \theta \cot \alpha$. Hence $r = e^{\theta \cot \alpha}$, e being the Napierian base of logarithms, is another form for the equation of the curve. Another system called 'parabolic spirals,' which has the general equation $r = a\theta^n$, contains the Archimedean S. ($r = a\theta$). This curve was discovered by Conon, who died before he had fully examined its properties. Archimedes continued the investigations and pub. his results in a tract on S. Another S. of this system is the hyperbolic S. ($r\theta = a$), the inverse of the Archimedean S. Other S. are the Lituus ($r = a\theta^{-1}$) and Cotes's S., $r \cos \theta = c$, which occur as the path of a particle projected in any manner under a central attractive force varying as the inverse cube of the distance.

Spiranthes (Lady's Tresses), genus of terrestrial orchids, three species of which are Brit. *S. autumnalis* bears white fragrant flowers in a close spiral on a spike.

Spire (Ger. *Spitze*), in Gothic architecture, the pyramidal mass erected on a tower by way of finish and ornament. Though a very striking feature in a building, the S. has nothing to recommend it on the score of utility. It contributes nothing to the internal effect, whereas the dome does. The S. is in many ways, therefore, a summing up of Gothic architecture, embodying all its grace, lightness, and proportion.

Spires, see **SPIER**.

Spirit (Lat. *spiritus*, breath, air, from *spirare*, to breathe), in philosophy, is a term used as equivalent to soul or mind, with no special meaning. The belief in some part of man that is immaterial in the strictest sense is not very generally found. Most races, however, believe that, at the moment of death, some part of the man passes away and begins a new existence. This part of man is generally associated with the breath. In modern theology the term S. usually denotes all the immaterial part of man, the ego, including the mind. In medieval scholastic theology S. was distinguished from soul on the grounds that S. was strictly immaterial and immortal, whereas the soul was the vital principle which was not necessarily immortal, e.g. in an animal, nor completely independent of matter. This terminology is still used by Rom. Catholic theologians. See **HOLY SPIRIT**.

Spirit, see **ALCOHOL**; **METHYLATED SPIRIT**; **PETROLEUM REFINING**; **PROOF SPIRIT**; **RECTIFIED SPIRIT**.

Spirit-fresco, see **MURAL DECORATION**.

Spirit, Holy, see **HOLY SPIRIT**.

Spiritism, see **SPIRITUALISM**.

Spirit-level, see **LEVEL**.

Spirit of Nitre, liquid made by acting upon alcohol with a mixture of sulphuric and nitric acids and copper. It is used in medicine. Its chief constituent is ethyl nitrite, C_2H_5ONO .

Spirit of Salt, see **HYDROCHLORIC ACID**.

Spiritualism, or **Spiritism**, in effect a system of professed communication with the 'unseen world,' sets out to prove by demonstration survival after death. Originating in America about the year 1848, and rapidly spreading to other parts of the world, there are now claimed to be 3,000,000 adherents in England alone. The movement was widely popularised by Sir Arthur Conan Doyle, who in his writings and lectures claimed S. to be 'a religion for those who find themselves outside all religions.'

There are two main groups of spiritualistic phenomena, mental and physical, and there are both mental and physical mediums (persons endowed with psychic awareness). In the presence of such persons alleged supernormal phenomena take place, often when the medium is in trance. Movement of objects without contact (telekinesis) is one type of physical phenomena. Information which is not in his normal knowledge given by a medium is a mental phenomenon. Many mediums have been detected producing alleged phenomena fraudulently, but there have been mediums (notably Douglas Home (1833-86), who was never satisfactorily exposed), who have submitted to examination, agreed to stringent control, and have still puzzled investigators.

Materialisation, the alleged building up of a living human form in ectoplasm exuded from the medium, is the culmination of spiritualistic physical demonstration. There are, however, few cases of complete materialisation which have satisfied critical observers. Considerably better evidence exists, however, for partial materialisation.

Spiritualistic mental phenomena have been extensively investigated by members of the Society for Psychical Research, and their records include many instances of mental phenomena unaccountable by known laws of nature.

See F. Podmore, *Modern Spiritualism*, 1902; J. Maxwell, *Metaphysical Phenomena*, 1903; Sir W. F. Barrett, *On the Threshold of the Unseen*, 1917; Sir A. Conan Doyle, *History of Spiritualism*, 1926; Sir O. Lodge, *Phantom Walls*, 1929, and *Edge of the Unknown*, 1930; W. Carlington, *The Story of Psychic Science*, 1931; N. Fodor, *Encyclopedia of Psychic Science*, 1933; F. W. H. Myers, *Human Personality*, 1935; J. A. Findlay, *Unfolding Universe*, 1935; H. E. Hunt, *Do We Survive Death?*, 1936; A. W. Osborn, *The Superphysical: Evidence for Continued Existence, Reincarnation, and Mystical States of Consciousness*, 1937; D. Saurat, *The End of Fear*, 1938; H. V. O'Neill, *Spiritualism: as Spiritualists have written of it*, 1944; G. W. Buttorworth, *Spiritualism and Religion*, 1944; also *Light*, organ of the London Spiritualist Alliance, and the *Proceedings and Journal* of the Society for Psychical Research.